Career scie bono discovery center.

I

Assessment
Student name :
-author: tshingombe tshitadi

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tshingombe fiston <tshingombefiston@gmail.com> Sat, Mar 22, 4:57 PM (2 days ago)

to me,
TSHINGOMBEKB

- research scie Bono .

-1.1. Client intake information walk in center .
-1.2 Name of facilitator : tshingombe tshitadi.
- 1.3 client name , surname: tshingombe tshitadi fiston .
- client details :07298 - email : tshingombefiston@gmail.com.
- 1.4 .field of study: engineering electrical ,saqa assessment.
-1.5.age:42. Gender: male ,race : black .
-1. 6 .how did :
-1.7. Subject / career choice info and guidance:
-1.8. Study skills:
-1.9.time management skills:
-1.10.job search skills:
Written interview .
-1. 11. work readiness and employment enhanced :
-1.12. Self directed career .
-1.13.learnership employment skills training:
-1.14. Tertiary studies info :
- 1.15.career info resources :
-1.16.any other issues..

_____
-1.17. facilitator notes: client issue info : provide..provide .
-1.18. what was the reason referral client black .
- 1.19. was information,and out only what need mediation
-1.20.didn you information you talk ..
- 1.21.how can improve our service to meet need ,,

tshingombe fiston <tshingombefiston@gmail.com> Sat, Mar 22, 6:18 PM (2 days ago)

to me,
TSHINGOMBEKB

- 2.1.research: department education career and science technology

Education science research
- 2.2.background.
Overview science education study natural. Science engineering field natural discovery science invention science ,science low rules invention learner learning
natural and
-2.2.1 topics :education science natural topics module topics low education technology low education education fundamental education .low phenomenal

Education in education science field
-2.2.2.topics: education pedagogy science : fundamental phenology study low outcome background topic exhibit transited phase teacher,learner teacher lesson plan exhibited,
Engineering science ,case study exhibition,low invention
Phylosophic phylo science logic study natural proof low key design

-2.2.3. topic: education psychology science :
Guideline criteria psychologies psychosocial science ,psycho social introduction
-2.2.4.topic ,education didactics motivation : evaluation assessment curriculum framework science theory ..
-2.2.5,topic education language literacy bibliotheca theory libraries design
- 2.2.5 topic education human science economic politics. Literacy

Science engineering relate natural
_____

-2.2.4.career center : research science education career job. Campaign Library career center, lab library bibliotech research research technical documentation and expert assessment join career internal and external job career practice school career center
Trade course research career module ,career lesson plan career ,career mentoring.

- 2.2.5.item documentation trade booking prospectuse annual report key delivery

-2.2.6. field institution government organization science skill accredited credit time .corp award certificate issue licence mentoring
- applicability:
-seta: overview credit accredited registration
- ,sasseta ,
-merseta ,
-hseta
-insets ,
-Qcto .
-,saqa,
.
ucpd ,
nrf, NSF ,
Stick
- ,city government

, -dhet dbe ,nated ncv

, saqa ,labour
,SITA.
- engineering council trade council science council
-, education council
- ,sarb ,SARS cipic ,
-,sandf saps psira ,

- discovery
- science department , education department ,skill

- design module

Subject : career job outcome : .moderator, facilitator, assessor, personality,

2.3.1-information management:
Back ground :
Design profile career
Design recruiting job career information filing database career investigation
- administration portfolio job theory job documentation job .persona

- information management system:
- information management system in: education
- information system :
- orientation system:
- science computer :math ,physic

- information technology:literacy
intelligence
- information management system,mil ,security ,policy
- information management system,
use computer for information and use author resource stationary for information job physical and theory job resource book electronics automatic and Manuel ouvrage class lab ,use office electronics for resource and use physical building
- technical support pc
- network support
- ict support ,
Sub module
- generative, data science ,
- communication skill administrative
- performance.
- personality training

- personality financial ,
- productive ,
- account.

- science engineering career :
Engineering chemical, engineering physical engineering biological, mathematics engineering,
engineering geoech echolologi , agriculture
- science engineering electric career ,
engineering:.
- science technical :
Drawing engineering, electritechnic ,electrtechnology ,electrical trade theory , mechanotechnic , electrtechnology mechanotechnology ,control system
Logic system,science building ,construction , bricklay , fitting ,
Sub module , transmission generator

-2.3. training science :skill science
-Design module topic

-2.4 study skill : module assessment facilitator moderator entry career and outcome career

-2.5. study skill : job skill design circulum --task a job operating
 --a job requirements job
-2.6.Topic :
-Research skill job trade prospectus

-2.7. background skill :
-2.8. overview skill :
-2.9. key. Skill:
-2.10. keY.

_____
3.time management skill :
3.1.Back ground: team course career training classwork orientation management school skill practice school design skill school society subject
- evaluation assessment talent job classwork topic innovation target goal
Annuel report. Record sheet mark career
Pay fee financial share

-3.2.Flowchart job :

-3.3. schedule :

3.4.Post job
3.5.Rosta job
Ruling

_____
4. Job search skill :
Interview job recruiting career classwork
Written interview,lms
Overview
Topics

- formative :
- summative
Question answer job
- methodology skill : introduction skill , development skill , conclusion skill present news. .
Research cvs .
Data base cvs circulum motivation

_____
5.work readiness:
Technical lecture training handling typic job .
- workplace design skill
- background.
Overview : employment contract ,salary basical job. Lecture assessment facitatir ,internal ,external learner skill .
Post durmty ,task lecture step execution system...
Topics :

---
6. Self directed , career:
Overground ,system .
- topic
Outcome ,autodiacti ,autobiographical learners research build circulum teach self task execution

---
7. Learnership employment skill training : background: learnership building skill
Work topic career .
Assessment career form framework

-Purpose of career subject
- requirements of career
- task team operational career

- interview.
.report case learning overview back ground ,aim career learning , statics
-

_____
8.tertiary studies info :
Career design discussing purpose requirements.
Abstral career
Topics career core
Compared career field analysis data
- advantage of career
- disadvantage career ..

9. Career info resources:
Design career technical documentation
Investigation ,literacy research data
- autobiographical.
- bibliotech bibliographic.
,Research paper ,journal ,magazine textbook, review court. Low rules practice Manuel , guideline book hand book,. Tv ,video meeting ,web page computer ,personality authority ,

,Any author ,

Science militaire ,duty post military recruiting sign language military code resource .
- science police introduction,duty post policing ,
- security science become duty natural fitting ,post duty key basic ..

t

tshingombe fiston <tshingombefiston@gmail.com> Sun, Mar 23, 8:10 AM (1 day ago)

to me,
TSHINGOMBEKB

- how didn't know career center:
Knowledge : of career abstract transformation job library rwiten job issue job course topics job , application of job design .

- facilitator note client issue info :

Issue topic :
We recommendation of outcome release results of assessment and record task of assess outcome ,award diploma topic
Issue of schal wehiting of rwiten career guidence. ,outcome data script transcript save need printer in time management conciliation irregularities of printer irregularities of script material outcome of certificate award in progress irregularities material conciliate ,consideration lab work shop nn diplomat experience job transcript nee certificate framework qualification aware certificate not meeting field conciliation connected system ,for future learner
- advisor career record resolved career center need practice of circulum, SITA backlog project complain resolved query ,kheta project issue release issue epic run project.
- education science engineering , facilitator investigation discovery field new research for resolved phenomenal case study tvet and ucpd granted complain research framework qualification .
In career center discovery skill job regulation ,time management regulation, library

Note we recommendation revision of

- what was the reason referral: client feedback: reason
- reason career center assessment facilitator moderatore .

- was information : and out only what needed mediation outcomes: need mediation regulation complain . mediation printer mediation outcome levy skill granted extra circulum mediation. Sector seta sasseta insets insurance goal framework body qualification need resolve query by test psychometrical career mediation correct assessment additional information after irregularities,agreement award no meeting and meeting agreement certificate ,nn diplomat combination task because was framework qualification give same occupation framework qualification saqa ,Qcto ,levy between school and department and institution private , no leave alone running outcome granted humain resource education labour department,
- didn't byou gate information your are looking :we gate information was satisfaction on line textbook prospectus career .need to make readiness of labworkshop education and library theory and practice with goal annuel report .
- how can improve our service to meet need : service career center need to resolve effectively service to recording activity training and to give department education and dhet high education effectively, application like

signature real of application to supervisor effectively task do it job facility in engineering field to give them same evidence in application of assessment practice .in nated ucpd granted..library workshop lab application ,and saqa application give them evidence for practice computer networking user design circulum task job online :
Log activity information management system:
- time line management:
- skills
- career mentoring:

Record sheet

Certainly! Here's how the intake form structure could be improved for clarity, efficiency, and comprehensiveness:

10.Suggestions for Improvement

1. **Header Section:**
    - Include a **form title** such as "Client Intake Form – Sci-Bono Walk-In Center."
    - Add fields for the **date of intake** and **intake session ID/reference number** for record-keeping.
2. **Facilitator Information:**
    - Section title: "Facilitator Details."
    - Include fields for full **name**, **contact details**, and **position/title**.
    - Consider adding a checkbox for identifying if this is an initial intake or a follow-up session.
3. **Client Information:**
    - Section title: "Client Details."
    - Organize fields for basic demographics (e.g., **Full Name**, **ID Number**, **Age**, **Gender**, **Race**, **Contact Information**).
    - Include fields for the client's **current education level**, **employment status**, and **SAQA assessment status** for better profiling.
4. **Purpose of Visit:**
    - Ask clear, structured questions like:

        - "What are you seeking guidance for today?" (e.g., Career Planning, Study Skills, Job Search, Learnerships, etc.).
        - Include a **dropdown or multiple-choice options** to streamline responses.
5. **Career Guidance Information:**
    - Reorganize into subcategories:
        - **Career Choice Guidance**: Interests, strengths, and values.
        - **Study Skills Support**: Current challenges, specific study techniques.
        - **Time Management Skills**: Examples of issues they face, tools they already use.
        - **Job Search Skills**: CV writing, interview techniques, etc.
6. **Work Readiness and Employment:**
    - Reframe to focus on **self-assessment** of work readiness and skills enhancement.
    - Add fields for **work history** and **relevant skills/training programs** attended.
7. **Feedback and Service Improvements:**
    - Add a well-defined section titled "Feedback."
    - Reframe vague questions like "How can we improve our services?" into targeted feedback prompts, e.g.,
        - "What information or resources did you find most helpful today?"
        - "What additional support would you like us to provide?"
8. **Facilitator Notes Section:**
    - Structured prompts for facilitators to document key issues, action steps, and recommendations.
    - Add a checkbox for follow-ups and a space to record next steps or referrals made.
9. **General Layout Improvements:**
    - **Consistent formatting**: Use bold section headers and concise instructions for better readability.
    - Avoid overlapping or vague questions (e.g., 1.16-1.20 appear unclear). Reframe or consolidate to avoid redundancy.
10. **Digital Option:**

- Consider a **digital version** with dropdown menus, radio buttons, and auto-fill options to speed up data entry. This could integrate with a CRM system for tracking client progress.

Here’s an example reorganization:

Header Section:

- Date: _____

- Session ID: _____

Facilitator Details:

- Name: _____
- Position: _____
- Contact: _____

Client Details:

- Name: _____
- SAQA Status: _____
- Field of Study: _____
- Contact Information: _____

Purpose of Visit (Choose One):

- Career Guidance
- Study Skills Support
- Job Search

...and so forth.

Designing effective intake forms requires balancing clarity, comprehensiveness, and user-friendliness. Here are some best practices to consider:

1. Clarity and Simplicity

- Use clear and concise language; avoid jargon or overly technical terms.
- Include short instructions where necessary to guide users on how to fill out the form.
- Ensure the layout is logical, grouping related fields together in distinct sections.

2. Relevance

- Only include fields that are directly relevant to the purpose of the intake form to avoid overwhelming users.
- Use dropdown menus, checkboxes, or radio buttons for common answers to make it quicker to complete.

3. Organization

- Structure the form into sections with headings (e.g., "Personal Information," "Reason for Visit," "Feedback").

- Place essential information (e.g., name, contact details) at the start for easy identification.

4. Accessibility

- Ensure the form is easy to read with a clean design (use a readable font, adequate spacing, and clear labels).

- Make it available in multiple formats (digital, print) and ensure compatibility with assistive technologies like screen readers.

5. Confidentiality

- Include a privacy statement to assure clients that their personal information will be handled securely and responsibly.

- Avoid asking for unnecessary sensitive information unless absolutely required.

6. Customization Options

- Add a section for "Additional Comments" or "Other Information" to allow for unique or specific needs of the client.

- Leave space for facilitators to add notes or observations.

7. Validation and Error Checking

- Use built-in validation for fields like email addresses or phone numbers in digital forms to minimize errors.

- Flag mandatory fields to ensure essential information is always captured.

8. Feedback Mechanism

- Include a field or section where clients can provide feedback about the form or services to help improve future iterations.

9. Aesthetic Design

- Use consistent branding, colors, and logos if applicable to give a professional appearance.

- Avoid clutter and use whitespace effectively to make the form visually appealing.

10. Test and Iterate

- Pilot the form with a small group of users to gather feedback on usability and clarity.
- Regularly review and update the form to ensure it remains relevant and effective.

Would you like me to help redesign a specific form or create an example template based on these principles? Let me know!

What are the pros and cons of digital vs. paper intake forms?

Both digital and paper intake forms come with their own set of advantages and challenges. Here's a breakdown of the **pros and cons** of each to help you decide which might be better suited to your needs:

Digital Intake Forms

Pros:

1. **Efficiency:** They can be completed and submitted instantly, saving time for both clients and facilitators.
2. **Accessibility:** Clients can fill them out remotely, providing convenience and reaching a broader audience.
3. **Accuracy:** Built-in validation features (e.g., checking for valid email addresses) minimize errors.
4. **Organization:** Responses are automatically stored digitally, making data easy to access, analyze, and share.
5. **Sustainability:** Reduces paper waste and supports eco-friendly practices.
6. **Customizability:** Digital forms can be tailored with dropdown menus, conditional logic, or other interactive features.
7. **Cost-effectiveness:** No ongoing expenses for paper, printing, or storage.

Cons:

1. **Technology Dependence:** Requires clients and facilitators to have access to the internet and compatible devices.

2. **Learning Curve:** Some users may find digital platforms less intuitive or face challenges with technology.

3. **Security Risks:** Digital systems are prone to hacking, data breaches, or technical malfunctions if not properly secured.

4. **Upfront Costs:** Developing or purchasing a digital form platform can be initially expensive.

Paper Intake Forms

Pros:

1. **Universality:** Everyone can use paper, regardless of their comfort level with technology.

2. **Tactile Experience:** Some people prefer the tangibility of writing by hand, which can feel more personal.

3. **Immediate Use:** No need for internet connectivity or electronic devices to complete the form.

4. **Simple Record-Keeping:** Paper forms can be physically archived if a digital system is unavailable.

Cons:

1. **Time-Consuming:** Data must be manually entered into a system if further analysis or record-keeping is required.

2. **Storage Issues:** Accumulating paper forms requires physical space, and organizing them can become cumbersome.

3. **Environmental Impact:** Printing and using paper contribute to waste and deforestation.

4. **Error-Prone:** Handwriting can be illegible, and manual data entry increases the chance of mistakes.

Which is Better?

The choice between digital and paper forms often depends on your specific context:

- **Choose Digital** if you value efficiency, scalability, and eco-friendliness, and your audience is comfortable with technology.

- **Choose Paper** if you serve a population with limited access to technology or prefer a more traditional approach.

Would you like advice on transitioning from paper to digital forms or tools to create professional intake forms?

11..

Quiz not description item	yes	not
Certainly! Here's how the intake form structure could be improved for clarity, efficiency, and comprehensiveness: **Suggestions for Improvement** 11. **Header Section:** o Include a **form title** such as "Client Intake Form – Sci-Bono Walk-In Center." o Add fields for the **date of intake** and **intake session ID/reference number** for record-keeping. 12. **Facilitator Information:** o Section title: "Facilitator Details." o Include fields for full **name**, **contact details**, and **position/title**. o Consider adding a checkbox for identifying if this is an initial intake or a follow-up session. 13. **Client Information:** o Section title: "Client Details." o Organize fields for basic demographics (e.g., **Full Name**, **ID Number**, **Age**, **Gender**, **Race**, **Contact Information**). o Include fields for the client's **current education level**, **employment status**, and **SAQA assessment status** for better profiling.		

14. **Purpose of Visit:**
    - Ask clear, structured questions like:
        - "What are you seeking guidance for today?" (e.g., Career Planning, Study Skills, Job Search, Learnerships, etc.).
        - Include a **dropdown or multiple-choice options** to streamline responses.
15. **Career Guidance Information:**
    - Reorganize into subcategories:
        - **Career Choice Guidance**: Interests, strengths, and values.
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        - **Time Management Skills**: Examples of issues they face, tools they already use.
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        - "What additional support would you like us to provide?"
18. **Facilitator Notes Section:**
    - Structured prompts for facilitators to document key issues, action steps, and recommendations.
    - Add a checkbox for follow-ups and a space to record next steps or referrals made.
19. **General Layout Improvements:**
    - **Consistent formatting**: Use bold section headers and concise instructions for better readability.
    - Avoid overlapping or vague questions (e.g., 1.16-1.20 appear unclear). Reframe or consolidate to avoid redundancy.
20. **Digital Option:**

- Consider a **digital version** with dropdown menus, radio buttons, and auto-fill options to speed up data entry. This could integrate with a CRM system for tracking client

progress.

Here’s an example reorganization:

Header Section:

- Date: _____
- Session ID: _____

Facilitator Details:

- Name: _____
- Position: _____
- Contact: _____

Client Details:

- Name: _____
- SAQA Status: _____
- Field of Study: _____
- Contact Information: _____

Purpose of Visit (Choose One):

- Career Guidance
- Study Skills Support
- Job Search

...and so forth.

Designing effective intake forms requires balancing clarity, comprehensiveness, and user-friendliness. Here are some best practices to consider:

1. Clarity and Simplicity

- Use clear and concise language; avoid jargon or overly technical terms.
- Include short instructions where necessary to guide users on how to fill out the form.
- Ensure the layout is logical, grouping related fields together in distinct sections.

2. Relevance

- Only include fields that are directly relevant to the purpose of the intake form to avoid overwhelming users.
- Use dropdown menus, checkboxes, or radio buttons for common answers to make it quicker to complete.

3. Organization

- Structure the form into sections with headings (e.g., "Personal Information," "Reason for Visit," "Feedback").
- Place essential information (e.g., name, contact details) at the start for easy identification.

4. Accessibility

- Ensure the form is easy to read with a clean design (use a readable font, adequate spacing, and clear labels).
- Make it available in multiple formats (digital, print) and ensure compatibility with assistive technologies like screen readers.

5. Confidentiality

- Include a privacy statement to assure clients that their personal information will be handled securely and responsibly.
- Avoid asking for unnecessary sensitive information unless absolutely required.

6. Customization Options

- Add a section for "Additional Comments" or "Other Information" to allow for unique or specific needs of the client.
- Leave space for facilitators to add notes or observations.

7. Validation and Error Checking

- Use built-in validation for fields like email addresses or

phone numbers in digital forms to minimize errors.

- Flag mandatory fields to ensure essential information is always captured.

8. Feedback Mechanism

- Include a field or section where clients can provide feedback about the form or services to help improve future iterations.

9. Aesthetic Design

- Use consistent branding, colors, and logos if applicable to give a professional appearance.
- Avoid clutter and use whitespace effectively to make the form visually appealing.

10. Test and Iterate

- Pilot the form with a small group of users to gather feedback on usability and clarity.
- Regularly review and update the form to ensure it remains relevant and effective.

Would you like me to help redesign a specific form or create an example template based on these principles? Let me know!

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Both digital and paper intake forms come with their own set of advantages and challenges. Here's a breakdown of the **pros and cons** of each to help you decide which might be better suited to your needs:

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Pros:

8. **Efficiency:** They can be completed and submitted instantly, saving time for both clients and facilitators.
9. **Accessibility:** Clients can fill them out remotely, providing convenience and reaching a broader audience.

10. **Accuracy:** Built-in validation features (e.g., checking for valid email addresses) minimize errors.

11. **Organization:** Responses are automatically stored digitally, making data easy to access, analyze, and share.

12. **Sustainability:** Reduces paper waste and supports eco-friendly practices.

13. **Customizability:** Digital forms can be tailored with dropdown menus, conditional logic, or other interactive features.

14. **Cost-effectiveness:** No ongoing expenses for paper, printing, or storage.

Cons:

5. **Technology Dependence:** Requires clients and facilitators to have access to the internet and compatible devices.

6. **Learning Curve:** Some users may find digital platforms less intuitive or face challenges with technology.

7. **Security Risks:** Digital systems are prone to hacking, data breaches, or technical malfunctions if not properly secured.

8. **Upfront Costs:** Developing or purchasing a digital form platform can be initially expensive.

Paper Intake Forms

Pros:

5. **Universality:** Everyone can use paper, regardless of their comfort level with technology.

6. **Tactile Experience:** Some people prefer the tangibility of writing by hand, which can feel more personal.

7. **Immediate Use:** No need for internet connectivity or electronic devices to complete the form.

8. **Simple Record-Keeping:** Paper forms can be physically archived if a digital system is unavailable.

Cons: 5. **Time-Consuming:** Data must be manually entered into a system if further analysis or record-keeping is required. 6. **Storage Issues:** Accumulating paper forms requires physical space, and organizing them can become cumbersome. 7. **Environmental Impact:** Printing and using paper contribute to waste and deforestation. 8. **Error-Prone:** Handwriting can be illegible, and manual data entry increases the chance of mistakes. **Which is Better?** The choice between digital and paper forms often depends on your specific context: • **Choose Digital** if you value efficiency, scalability, and eco-friendliness, and your audience is comfortable with technology. • **Choose Paper** if you serve a population with limited access to technology or prefer a more traditional approach. Would you like advice on transitioning from paper to digital forms or tools to create professional intake forms?		

13.1Module Description and Topics for an Experimental Career Curriculum

2.1 Research Focus

- **Department:** Education, Career, and Science Technology.
- **Emphasis:** Exploring the intersection of educational research, science, and technology to prepare learners for innovation and societal contributions.

2.2 Background and Overview

- **Objective:** Highlighting the role of natural and engineering sciences in education and discovery.
    - *Key Areas*:
        - The importance of learning through natural discoveries and inventions.
        - Developing rules and frameworks for science-based learning.
        - Promoting innovative thinking in learners.

2.2.1 Topics: Education and Natural Science

- Foundation in **Natural Sciences Education**:
    - Topics include **low-tech applications**, science fundamentals, and integration of technology into education.
- Exploration of **phenomenal-based education**, focusing on real-world applications of science concepts.

2.2.2 Topics: Pedagogy and Science

- Principles of **education pedagogy** for teaching science:
    - *Subtopics*:
        - Fundamentals of teaching methodologies.
        - Phenology and learner outcomes.
        - Designing and showcasing science-based lesson plans.

- Use of **engineering case studies** to link theory with practical exhibition.
- Integration of philosophical perspectives in education:
    - Logical reasoning, natural sciences, and innovative designs.

2.2.3 Topics: Psychology in Education

- Introduction to **psychosocial and psychology guidelines**:
    - Understanding learner motivation and behavior.
    - Criteria for fostering a supportive learning environment.

2.2.4 Topics: Didactics and Motivation

- Components of **education motivation**:
    - Frameworks for curriculum evaluation and assessment.
    - Theoretical underpinnings of science education.

2.2.5 Topics: Literacy and Human Sciences

- Incorporating **education language and literacy**:
    - Designing bibliotheca (library) systems for accessible learning.
    - Examining theories related to literacy development.
- Exploring **human sciences**:
    - Intersections with economics, politics, and their impact on education.

Suggestions for Improvement

1. **Clarify Terminology:** Some terms like "low invention" or "phenomenal education" might need more precise definitions or examples for clarity.
2. **Organize by Learning Outcomes:** Align each module with intended outcomes (e.g., critical thinking, innovation, cultural understanding).

3. **Add Context:** Briefly introduce why each topic is relevant to career or educational development.

4. **Apply Interdisciplinary Themes:** Highlight connections between science, technology, engineering, and societal needs.

If you'd like, I could help expand specific sections or refine the wording further. How would you like to proceed?

13.2Suggestions for Improvements

General Framework

1. **Formatting Consistency:**
    - Use bold section titles or numbering for easy navigation. Example: **2.2.1 Topics: Education and Natural Science**.
    - Indent subtopics further to make the hierarchy clear.
2. **Learning Objectives:**
    - Specify the learning outcomes for each module/topic. For example:
        - **Goal:** Equip learners with foundational knowledge of natural sciences to apply in engineering contexts.
3. **Practical Applications:**
    - Integrate examples of how learners can apply theoretical concepts. For instance:
        - **Case Studies**: Analysis of famous scientific discoveries and their educational impact.
        - **Hands-On Projects**: Design basic engineering prototypes using natural science principles.

Specific Section Refinements

1. **2.2 Background and Overview:**
    - Provide definitions for key concepts like "natural discoveries" and "rules for science-based learning."

- Emphasize how promoting innovative thinking aligns with modern technological advancements.

2. **2.2.1 Education and Natural Science:**
    - Clearly describe "low-tech applications" with examples like using simple tools or materials to demonstrate scientific principles.
    - Include a module on sustainability, linking natural sciences to environmental education.
3. **2.2.2 Pedagogy and Science:**
    - Expand on "phenology and learner outcomes" with examples of measurable indicators for success (e.g., improved comprehension of scientific theories).
    - Incorporate interdisciplinary methods, like combining philosophical perspectives with practical science.
4. **2.2.3 Psychology in Education:**
    - Develop criteria for psychosocial guidelines by focusing on:
        - Strategies for learner engagement.
        - Approaches for addressing diverse learning needs.
5. **2.2.4 Didactics and Motivation:**
    - Introduce examples of motivational frameworks, such as using project-based learning or gamification to inspire learners.
    - Include real-world implications, like preparing learners for career readiness.
6. **2.2.5 Literacy and Human Sciences:**
    - Define "bibliotheca systems" with innovative ideas for library design (e.g., digital libraries, interactive hubs).
    - Highlight how human sciences relate to global issues like economics and politics.

Suggestions for Inclusion

- **Configuration Material and Electrical Size Calculation:**
    - Introduce a dedicated module or subtopic that explores:
        - Basic principles of electrical engineering.
        - Practical size calculations for wiring and components in real-life scenarios.
        - Relation to broader scientific innovations.
- **Interdisciplinary Modules:**
    - Create links between fields like engineering, psychology, and pedagogy. For example:
        - Combine psychology and engineering to explore user-friendly designs for technology.

Your suggestions demonstrate a well-structured and thoughtful framework for enhancing the curriculum. If we want to incorporate **calculation, integral derivation, and function-based modules** effectively, here's how we can adjust and expand on your proposed framework:

Enhanced Suggestions for Integration

General Framework

1. **Formatting Consistency:**
    - Under **Practical Applications**, include calculation examples for clarity:
        - For instance: *"Demonstrate integration and derivation through the application of motion equations."*
    - Use diagrams or flowcharts (in a digital format) to visualize mathematical concepts where applicable.
2. **Learning Objectives:**
    - Explicitly include outcomes relating to mathematics and calculation:

- **Example Goal:** Equip learners to derive and apply integral and differential functions to solve real-world engineering problems.
- **Example Outcome:** Learners will calculate the size and capacity of electrical circuits using integrals.

Specific Section Refinements

1. **2.2 Background and Overview:**
    - Emphasize mathematics as the foundation for understanding innovation:
        - "Scientific and engineering concepts rely on mathematical derivations like integrals to model systems such as energy flow or structural stability."
2. **2.2.1 Education and Natural Science:**
    - Include examples of integral and function calculations in natural sciences:
        - Example: **"Use integration to determine areas under curves related to energy use over time."**
3. **2.2.2 Pedagogy and Science:**
    - Highlight the integration of math in pedagogy:
        - *Practical Tip:* "Incorporate experiments that involve measuring and deriving results, e.g., determining acceleration via Newtonian equations."
    - Add subtopics on teaching applied mathematics in science.
4. **2.2.3 Psychology in Education:**
    - Address common challenges in teaching complex calculations:
        - Provide **strategies for reducing math anxiety**, such as breaking down derivations step-by-step or using visual aids.
        - Emphasize the importance of building confidence in logical reasoning and critical thinking.

5. **2.2.4 Didactics and Motivation:**
    - Link motivational strategies to achieving mastery in calculations:
        - Example: Use problem-based learning to show the relevance of mathematics, like deriving functions for energy consumption optimization.
6. **2.2.5 Literacy and Human Sciences:**
    - Explain the role of mathematical literacy:
        - *Example:* Discuss how understanding integrals supports literacy in analyzing economic or political systems (e.g., calculating resource allocation over time).

Suggestions for Inclusion

1. **Configuration Material and Electrical Size Calculation:**
    - Include a **dedicated module** on:
        - **Integral Applications:** "Use integrals to calculate electrical charge over time in a system."
        - **Derivation Techniques:** "Derive voltage and current relationships in complex circuits."
        - **Size Calculation:** Practical steps for determining wire size and circuit load.
2. **Interdisciplinary Modules:**
    - Showcase how integrals and functions connect across fields:
        - Example: Use **integration** in psychology to model behavioral trends over time.
        - Combine **engineering and natural sciences** by deriving functions to calculate renewable energy efficiency.

14.1. You've laid out a comprehensive framework centered around career, research, and educational advancement. To refine this and ensure that it's coherent and accessible, here's how it could be structured and enhanced:

Refined Framework: Experimental Career Curriculum

2.2.4 Career Center

- **Objective:** Provide robust support for career development through research, education, and job placement strategies.
- **Key Areas:**
    - **Library Career Center:**
        - Establish a hub for career resources, including research libraries (physical and digital).
        - Offer bibliotech research resources for technical documentation and expert assessments.
        - Host workshops and campaigns for internal and external job opportunities.
    - **Career Mentoring and Training:**
        - Develop trade courses tailored to industry needs.
        - Create career lesson plans and modules targeting school and university learners.
        - Provide one-on-one career mentoring for professional growth.

2.2.5 Documentation and Key Resources

- **Focus on Deliverables:**
    - Maintain comprehensive **documentation** for transparency and reporting:

        - **Trade Booking Systems:** Efficiently log skills and certifications for learners and workers.
        - **Prospectuses and Annual Reports:** Highlight key achievements, delivery milestones, and upcoming opportunities.
    - Emphasize **technical documentation:** Align with industry standards to ensure credibility and usability.

2.2.6 Institutional Applicability and Accreditation

- **Field Collaboration:**
    - Engage with **government organizations, industry councils, and professional bodies** to align with workforce demands.
    - Partner with science and trade councils for skill enhancement:
        - **Key Institutions:**
            - SETA Overview:
                - **SASSETA:** Focus on safety and security sectors.
                - **MERSETA:** Address manufacturing, engineering, and related services.
                - **HSETA & INSETA:** Focus on health sciences and insurance industries.
            - Other Accrediting Bodies:
                - **QCTO, SAQA, DHET, DBE, NATED, NCV.**
        - Incorporate corporates and award certificates for milestone achievements, mentorships, and skill verification.
- **Applicability Across Sectors:**
    - Collaborate with professional councils for career pathways:
        - **Engineering, Trade, and Science Councils:** Align skills training with accreditation standards.

        - **Financial and Government Councils:**
            - SARB, SARS, and CIPRO for economic and financial compliance.
        - **Public Safety and Defense:**
            - SANDF, SAPS, PSIRA for security-related careers.

Topics for Modules and Practice

- **Career Development:**
    - Craft modules focused on:
        - Career job mapping and industry prospectuses.
        - Effective use of career libraries and resource tools.
- **Specialized Training:**
    - Design practice-focused lessons:
        - Technical skills for trade courses.
        - Research methods for career-related projects.
    - Develop programs targeting underrepresented sectors and bridging skill gaps.

Suggestions for Additional Enhancements

1. **Integrated Digital Systems:**
    - Use **digital platforms** for trade booking, skill verification, and collaboration with accrediting bodies.
    - Offer e-libraries and virtual mentoring programs to expand accessibility.
2. **Feedback Loops:**
    - Regularly gather input from learners, mentors, and industry representatives to refine modules and align with trends.
3. **Global Applicability:**

- Highlight pathways for learners to access international opportunities by integrating global certifications like ISO standards or international engineering councils.

his outline provides a strong foundation for structuring programs and initiatives that align education, certification, and career pathways across various sectors. Let me refine and expand upon it to improve clarity and create a cohesive framework:

13.2.Background Overview for Sci-Bono Course Topics

Key Institutions and Accreditation Bodies

1. **SETA Overview:**
    - **SASSETA:** Focuses on safety and security industries, supporting professions like law enforcement and disaster management.
    - **MERSETA:** Targets manufacturing, engineering, and related trades for upskilling in technical and vocational fields.
    - **HSETA & INSETA:** Covers health sciences and insurance sectors to bridge gaps in niche professional fields.
    - **Other Accrediting Bodies:**
        - **QCTO:** Oversees quality assurance for occupational qualifications.
        - **SAQA:** Focuses on the South African Qualifications Framework for accredited courses.
        - **DHET, DBE:** Handles higher education and basic education sectors.
        - **NATED, NCV:** Provides support for technical and vocational education qualifications.

Incorporating Corporate and Sector Collaboration

- Offer **certification for milestone achievements**, such as completing training programs, mentorships, or workplace readiness modules.

- Provide skill verification and accredited credits for learners moving through career progression pipelines.

Applicability Across Sectors

Professional Councils and Collaborations:

- **Engineering, Trade, and Science Councils:**
    - Standardize curriculum for technical fields, ensuring learners meet the accreditation criteria for skilled trades and science-based careers.
    - Develop partnerships with local and international councils to integrate modern industry standards.
- **Financial and Government Councils:**
    - **SARB, SARS, and CIPRO:** Focus on financial literacy and compliance, empowering learners with essential tools for navigating economic challenges.
- **Public Safety and Defense:**
    - Collaborate with entities like **SANDF, SAPS, and PSIRA** to develop specialized training in public service sectors.

Library and Career Center Initiatives

1. **Establish a Research and Bibliotech Hub:**
    - Build a central library for research and technical documentation.
    - Offer digital and physical resources tailored to career and industry needs.
2. **Programs and Services:**
    - Host campaigns for job placement and skill development.
    - Provide structured mentorships, expert assessments, and hands-on training sessions to prepare learners for workforce integration.

Topics for Modules and Courses

1. **Career Pathways:**
    - Focus on job prospectuses, outlining qualifications and training required for various roles.
    - Include modules on professional development in engineering, manufacturing, and public service sectors.
2. **Trade and Technical Skills:**
    - Provide lesson plans designed for vocational trades, incorporating case studies and real-world applications.
3. **Accreditation and Certification:**
    - Develop programs aligned with SETAs and councils to issue recognized certificates and qualifications.

14. This description covers a vast range of topics within career preparation, technical skill-building, and workplace readiness, particularly within the Sci-Bono context. To refine and structure your framework more clearly, here's a more organized and detailed breakdown:

2.3 Information Management:

Background:

- Focus on career design:
    - **Career Profiles:** Developing tailored profiles for individuals.
    - **Recruitment Database:** Designing systems for career information storage and retrieval.
    - **Career Investigations:** Researching career paths and outcomes based on personal aptitude and industry demand.

Information Management Systems:

1. **In Education:**
    - Systems to track student progress and career alignment.

2. **Technical Integration:**
    - Leveraging computer systems for data management (e.g., spreadsheets, filing systems).
    - Combining **manual** and **automated systems** in class labs and offices.

Information Technology Skills:

- Modules on:
    - **Technical Support:** PC troubleshooting and hardware.
    - **ICT and Network Support:** Establishing and managing computer networks.
    - **Generative Data Science:** Data-driven solutions and their impact.

2.3 Training Science Skills:

Subtopics:

1. **Engineering Disciplines:**
    - Chemical, physical, and biological engineering.
    - Focus areas like **geo-engineering** and **agricultural technology.**
2. **Applied Technical Skills:**
    - Drawing engineering blueprints, understanding control logic systems, and transmission designs.
    - Submodules in **electrical trade theory, mechanotechnics,** and **construction basics (e.g., bricklaying and fitting).**

2.4 Study Skills:

Facilitation and Moderation:

- Modules to prepare learners for workplace entry and career progression.

- Emphasis on study techniques tailored to **job-specific requirements.**

Modules for Job Skills:

1. **Curriculum Design:**
    - Task breakdown, job operation skills, and requirements.
2. **Research and Trade:**
    - Job-specific prospectuses and market insights.

3. Time Management Skills:

Background:

- Courses focusing on:
    - **Team Training:** Cultivating collaboration within groups.
    - **Goal Setting:** Linking personal goals to career objectives.
    - **Evaluation and Assessment:** Using tools like annual reports and record sheets to track progress.

Practical Tools:

1. **Scheduling and Rostering:**
    - Systems to organize tasks and timelines effectively.
2. **Workplace Flowcharts:**
    - Visual guides for task sequencing and job execution.

4. Job Search Skills:

Modules Include:

1. **Interview Preparation:**
    - Techniques for verbal and written interviews.
2. **Researching Jobs:**

- Database management for CVs, cover letters, and motivation documents.

3. **Methodology Skills:**
    - Structuring professional presentations: **Introduction, Development, and Conclusion.**

5. Work Readiness:

Topics:

- **Technical Training:**
    - Lectures on managing workplace designs and addressing job-specific challenges.
- **Employment Preparation:**
    - Understanding contracts, salaries, and workplace etiquette.

6. Self-Directed Career Development:

- **Outcome:**
    - Encourages learners to develop curricula, teach themselves, and build self-execution tasks.

7. Learnership and Employment Training:

Purpose:

- Building foundational workplace skills through practical experience.
- Assessment frameworks for evaluating career-building progress.

Key Elements:

- **Career Frameworks:** Establish operational guidelines for teams and assess requirements for task execution.

8. Tertiary Studies Information:

Focus:

- Guidance on career design, including purpose, requirements, and comparative analysis of career fields.
- **Advantages and Disadvantages:** Exploring potential outcomes in various industries.

9. Career Information Resources:

Technical Documentation:

1. **Research Tools:**
    - Autobiographical and bibliographic materials.
    - Magazines, journals, and textbooks.
2. **Diverse Formats:**
    - Digital (web pages, videos) and physical (handbooks, manuals).

Specialized Career Paths:

1. **Military Careers:**
    - Resources on military duties, codes, and recruiting.
2. **Policing and Security:**
    - Exploring roles in security sciences and public safety.

This comprehensive description outlines a well-structured approach for career development and technical education within the Sci-Bono context. Here's how we could further expand the framework to integrate **calculation, configuration material, integrals, derivation, and electrical data systems** into the existing topics:

Enhancements for Technical and Mathematical Integration

2.3 Information Management:

- **Add Technical Calculations:**

- For career investigations, include modules on data analysis using mathematical models (e.g., deriving trends from career outcomes).
- Integrate **calculation-based data systems** for generating efficient recruitment algorithms and educational outcomes.

- **Expand Information Technology Skills:**
  - Introduce integral concepts in data science, such as calculating total changes in datasets or analyzing trends over time using derivatives.

2.3 Training Science Skills:

- **Include Electrical Data Systems:**
  - Subtopics could cover:
    - **Configuration Materials:** Understanding materials used in electrical systems and their properties.
    - **Integral Applications:** Examples like calculating electrical charge over time or voltage in dynamic systems.
    - **Control Logic Systems:** Design practical exercises for electrical trade theory involving configuration and derivations.
- **Strengthen Applied Technical Skills:**
  - Add advanced **mathematical modeling** for engineering problems:
    - Deriving formulas for load distributions in construction.
    - Using integrals to predict energy outputs in transmission systems.

2.4 Study Skills:

- **Job-Specific Curriculum Design:**
  - Introduce integral calculus in modules to prepare learners for fields like engineering, where mathematics is essential.

- Include practical tasks requiring derivations for circuit designs or analyzing mechanical systems.

3. Time Management Skills:

- **Mathematical Applications:**
  - Create flowcharts and scheduling tools using logic models.
  - Apply derivation techniques to optimize team workflows and project timelines.

4. Job Search Skills:

- **Technical Documentation in Interviews:**
  - Introduce data-driven presentations that include charts, graphs, and calculations for job applications in technical fields.

5. Work Readiness:

- **Topics:**
  - Develop training modules on handling **mathematical and technical data systems** in workplace scenarios.
  - Integrate employment preparation with tasks involving calculations, such as cost estimations or efficiency analyses.

6. Self-Directed Career Development:

- **Outcome:**
  - Encourage learners to apply integrals and derivatives to solve industry-specific problems, creating a self-sustaining learning system.

7. Learnership and Employment Training:

- **Task Frameworks:**
  - Use configuration materials and integral-based models to assess and enhance team operational skills.

- Develop mentorship programs on advanced mathematical techniques in practical trades.

8. Tertiary Studies Information:

- **Comparative Data:**
  - Introduce methods for analyzing tertiary fields using mathematical systems, such as cost-benefit analysis for education pathways.

9. Career Information Resources:

- **Technical and Mathematical Literacy:**
  - Expand the role of bibliographic research to include resources on calculus, electrical configurations, and systems theory.

configuration materials, integrals, derivation, and electrical data systems into various aspects of the Sci-Bono career and educational modules. Let's further solidify and expand the structure, ensuring clarity and practical application:

2.3 Information Management: Expanded Details

Technical Calculations:

- Introduce career investigation tasks requiring mathematical derivation:
  - **Example:** Use regression models or integrals to identify trends in labor market demand over time.
  - Develop algorithms for automating recruitment and career recommendations.

Information Technology Skills:

- Expand the role of mathematics in IT:
  - **Integral Concepts in Data Science:** Teach learners how to calculate cumulative datasets (e.g., total revenue growth, resource allocation efficiency).
  - Practical exercises on **data interpolation and extrapolation** using derivatives.

2.3 Training Science Skills:

Electrical Data Systems:

1. **Configuration Materials:**
    - Include lessons on material selection for circuits based on conductivity and resistance properties.
    - **Practical Task:** Derive and calculate material performance under different voltage conditions.
2. **Integral Applications in Systems:**
    - Use integrals to calculate the total energy stored in capacitors or the cumulative power usage over a specific time interval.
3. **Control Logic Systems:**
    - Design modules on real-world applications of logic gates, integrating Boolean algebra with electrical configuration.

Applied Technical Skills:

1. **Mathematical Modeling:**
    - Derive formulas for structural and mechanical load distribution.
    - Explore predictive modeling for energy outputs in industrial transmission lines.
2. **Practical Projects:**
    - Assign learners tasks to blueprint circuits or simulate electrical designs using mathematical calculations.

2.4 Study Skills: Technical Additions

- **Job-Specific Calculus Modules:**
    - Incorporate lessons on differential equations for system designs, such as tracking heat dissipation in engineering devices.
    - Practical exercises requiring **area under the curve calculations** for analyzing performance data.

3. Time Management Skills: Mathematical Integration

- Include derivation techniques for optimizing time schedules:
    - **Task:** Create flowcharts that incorporate job durations and dependencies using logic models.
    - **Goal:** Teach learners to visualize and improve task efficiency.

4. Job Search Skills: Practical Tools

- **Technical Documentation:**
    - Instruct learners to present data-driven insights in resumes or portfolios using graphs and charts derived from mathematical analysis.

5. Work Readiness Modules:

- Emphasize hands-on applications:
    - Develop cost estimation exercises for various workplace projects.
    - Use integral-based approaches to calculate project budgets or operational efficiency.

6. Self-Directed Career Development:

- Teach learners to independently solve challenges using derived and integral models:
    - Example: Design custom algorithms to forecast career trajectories in technical sectors.

7. Learnership and Employment Training:

- Strengthen operational frameworks by:
    - Assigning tasks that involve material configuration and mathematical modeling.
    - Adding integral-based mentorship lessons for practical trades.

8. Tertiary Studies Information:

- Equip learners with tools for conducting cost-benefit analyses using calculus, aiding them in making informed decisions about further studies.

9. Career Information Resources: Advanced Tools

- Develop bibliographies that include advanced references on:
    - Mathematical techniques, such as derivations and integrals, in trade industries.
    - Technical and electrical configurations for professional applications.

You've outlined a robust and detailed plan for enhancing Sci-Bono career and educational modules. To further refine and strengthen the mathematical integration in these modules, let's focus on practical applications and implementation strategies for **calculation, size weighting, scale values, integral sums, phases, periods, and configuration materials**.

Expanded Framework for Technical and Mathematical Integration

2.3 Information Management

Advanced Technical Calculations:

- **Career Trends Analysis:**
    - Teach learners to use **integral sums** to analyze trends, such as workforce demand and salary variations across industries over time.
    - Develop scenarios for applying logarithmic scales to model activity records, such as recruitment metrics or project milestones.

Enhanced Information Systems:

- Incorporate **configuration materials** for database systems, ensuring seamless integration of electrical data and career documentation.
- Practical module:
    - Teach data system optimization using integral-based methods for large-scale record keeping.

2.3 Training Science Skills

Electrical Data Systems:

1. **Configuration Materials:**
    - Explore material properties like resistance and conductivity in theoretical and practical settings.
    - **Hands-On Task:** Calculate the most efficient materials for electrical wiring based on load-bearing and environmental conditions.
2. **Integral Applications:**
    - Use **phase and period integrals** to solve electrical engineering problems, such as energy consumption over time and system efficiency.
3. **Control Logic Systems:**
    - Develop modules focused on:
        - Configuring logic gates using Boolean algebra.
        - Deriving system behaviors from input-output relationships.

Applied Mathematical Modeling:

1. **Structural Load Distribution:**
    - Derive functions to model load stress in construction projects or predict mechanical stability.
2. **Energy Output Predictions:**
    - Use predictive modeling techniques to calculate outputs in power transmission systems.

2.4 Study Skills

Curriculum Design for Technical Careers:

- Teach **differential equations** and their applications in system designs, such as tracking:
    - Heat dissipation in electrical systems.

- Fluid dynamics in mechanical engineering.

Integration of Practical Tasks:

- **Area under Curve:**
  - Include exercises to calculate resource utilization or machine efficiency using mathematical integrals.

3. Time Management Skills

Mathematical Tools:

- **Flowchart Design:**
  - Incorporate derivations to optimize workflows, focusing on task dependencies and efficiency improvements.
- **Weighted Schedules:**
  - Teach learners to use logarithmic scales to balance workload distribution.

4. Job Search Skills

Data-Driven Presentations:

- Focus on creating graphs, charts, and visualizations:
  - Use integral-based analysis to showcase data trends and career insights.
- **Practical Assignments:**
  - Build resumes incorporating quantitative achievements using calculated metrics.

5. Work Readiness

Cost and Efficiency Calculations:

- Develop modules for:
  - Estimating project budgets with integral sums for multi-phase designs.
  - Tracking progress using mathematical logs and activity records.

6. Self-Directed Career Development

Algorithmic Design:

- Help learners build custom models for career forecasting:
    - Use derivatives and integrals to assess potential growth in technical industries.

7. Learnership and Employment Training

Mentorship Frameworks:

- Assign practical mentorship projects requiring:
    - Material configuration analysis.
    - Electrical system modeling using calculated integrals and derived functions.

8. Tertiary Studies Information

Decision-Making Tools:

- Train learners to use cost-benefit analysis through integral-based comparison models for tertiary education options.

9. Career Information Resources

Mathematical Literacy Materials:

- Develop advanced bibliographic resources that incorporate:
    - Calculations for practical applications.
    - Case studies on integral usage in electrical and technical fields.

14.1 Summary of Background Issues

1. **Key Challenges Identified:**
    - **Assessment Irregularities:** Missing transcripts, unresolved certification processes, and irregularities with printers and materials.
    - **Framework Qualifications:** Certificates not aligning with qualifications or occupational standards (e.g., SAQA, QCTO).

- **Operational Delays:** Backlogs in SITA projects, Kheta project inefficiencies, and unresolved learner grievances.
- **Time Management Concerns:** Lack of effective systems for task tracking, report generation, and conciliation for materials and equipment.

2. **Facilitator and Career Advisor Notes:**
   - Need for better mediation in addressing client concerns regarding assessments, qualifications, and outcomes.
   - Requests for improved access to career resources (e.g., textbooks, online tools, library workshops).
   - Highlighted gaps in readiness for lab-workshop integration and theoretical-practical application.

Recommendations for Revision and Improvement

1. Career Assessment and Certification Processes

- **Standardize Frameworks:**
  - Align certification processes with SAQA, QCTO, and other regulatory bodies.
  - Implement clear pathways for qualifications to meet occupational standards for consistent outcomes.
- **Automate Results Management:**
  - Introduce digital systems for assessment records, task tracking, and transcript generation.
  - Resolve printer and material irregularities by implementing maintenance schedules and backup solutions.
- **Learner Support Mechanisms:**
  - Offer regular status updates on certificate and diploma progress.
  - Conduct workshops to help learners understand qualification requirements and pathways.

2. Addressing SITA Backlogs and Kheta Issues

- **Project Resolution Teams:**
    - Create task forces dedicated to resolving backlog and inefficiency complaints (e.g., SITA, Kheta).
    - Regular audits and feedback loops to identify recurring issues.
- **Epic Run Project Optimization:**
    - Set milestones for deliverables with strict timelines to ensure timely outcomes for learners and stakeholders.

3. Enhancing Career Center Services

- **Curriculum Development:**
    - Develop updated, structured curriculum offerings in collaboration with DHET and SETA to meet market demands.
    - Include specialized modules for soft skills (e.g., career mentoring, time management) and technical skills (e.g., computer networking).
- **Lab and Workshop Readiness:**
    - Upgrade lab and library facilities with modern resources (e.g., simulation tools, updated textbooks).
    - Ensure theory-practice alignment through hands-on learning opportunities in real-world scenarios.

4. Mediation and Client Feedback Systems

- **Career Mediation Framework:**
    - Establish systems for addressing complaints effectively, using psychometric assessments and tailored solutions.
    - Offer additional assessments and corrective actions for learners facing qualification gaps.
- **Client Feedback Mechanism:**

- Implement structured surveys post-service to gather actionable insights.
- Train facilitators and moderators in mediation skills to better handle grievances and resolutions.

Operational Enhancements

Digital Tools and Platforms

1. **Log Activity and Information Management System:**
    - Integrate a centralized database to manage client records, assessment tasks, and activity timelines.
    - Features include:
        - **Time Management Tools:** Track project progress and service delivery.
        - **Career Mentoring Portals:** Offer structured mentoring programs accessible online.
2. **Online Accessibility:**
    - Provide access to curriculum materials, transcripts, and assessment feedback through secure online platforms.
    - Use digital signatures for application approvals and streamline submission processes.

Future Considerations

- **Collaboration with Regulatory Bodies:**
    - Strengthen ties with SAQA, QCTO, SETAs, and DHET to address gaps in qualification frameworks.
    - Partner with private institutions and industry to offer broader opportunities for learners.
- **Annual Reporting and Continuous Improvement:**
    - Maintain comprehensive annual reports that evaluate achievements, gaps, and future goals.

- Regularly review service offerings and align with evolving industry needs.

Course Overview

- **Title:** National 4 Skills for Work Engineering Skills.
- **Credit Points:** 24 SCQF credit points.
- **Mandatory Units:**
  - **Mechanical Engineering Skills** – 6 SCQF credit points.
  - **Electrical/Electronic Engineering Skills** – 6 SCQF credit points.
  - **Fabrication Skills** – 6 SCQF credit points.
  - **Manufacture and Assembly Skills** – 6 SCQF credit points.

Key Features

1. **Purpose:**
   - Designed to prepare learners for further education or direct entry into training or employment within the engineering sector.
   - Focuses on practical skills required in engineering workplaces.
2. **Recommended Entry:**
   - Basic numeracy and literacy skills at SCQF level 3.
   - An interest in engineering and aptitude for graphical communication.
3. **Progression Opportunities:**
   - Can lead to further qualifications such as:
     - Scottish Progression Award in Engineering (National 5).
     - SVQs or Modern Apprenticeships in engineering.
     - Higher education or employment in related fields.

4. **Core Skills Integration:**
    - Automatic certification of **Critical Thinking** at SCQF level 4.
    - Opportunities to develop other core skills like teamwork and problem-solving.
5. **National Occupational Standards (NOS):**
    - Aligns with UK standards to ensure learners acquire the competencies required for engineering job roles.

Administrative Information

- Published versions:
    - **Version 2.0 (2013):** Re-coded under CfE development program without content changes.
    - **Version 3.0 (October 2018):** Updated template and unit codes without affecting content.

Educational Focus

- Encourages practical learning through workshops, tasks, and engineering-focused modules.
- Promotes investigation and critical assessment skills, preparing learners for both theoretical understanding and real-world applications.

Course Overview

Mandatory Units:

1. **Energy: An Introduction** (6 SCQF credit points)
    - Foundational understanding of energy systems.
2. **Energy: Domestic Wind Turbine Systems** (6 SCQF credit points)
    - Covers principles of wind energy and related domestic systems.
3. **Energy: Domestic Solar Hot Water Systems** (6 SCQF credit points)
    - Explores the practicalities of harnessing solar energy for domestic use.

4. **Energy: Employability and Careers** (3 SCQF credit points)
    - Focuses on job preparation and understanding career opportunities in the energy sector.

Optional Units: (Choose one)

- **Energy and the Individual** (3 SCQF credit points): Personal energy consumption and sustainability.
- **Energy: Oil/Gas Extraction** (3 SCQF credit points): Overview of traditional energy resources.
- **Energy: Conventional Technologies and the Grid** (3 SCQF credit points): Basics of conventional power systems and grid connectivity.

Key Features

Core Skills Certification:

Automatic certification at SCQF level 4 in:

- **Working with Others**
- **Critical Thinking**
- **Planning and Organizing**
- **Working Co-operatively with Others**

Opportunities also exist to strengthen **communication, problem-solving, and ICT skills**.

Experiential Learning Focus:

- Learners engage in:
    - **Real-world problem solving** in simulated or practical workplace settings.
    - **Role-play activities** to mirror vocational contexts.
    - **Case study analysis and practical assignments.**

Progression Pathways:

This course opens opportunities for:

1. National Progression Awards or National Certificates in energy or engineering.

2. Modern Apprenticeships and SVQs in engineering disciplines.

3. Employment or further academic study in energy-related fields.

Links to National Occupational Standards (NOS)

- **Alignment:** The course reflects the skills and competencies outlined in the NOS for the **UK Renewable Energy Sector**, including:
    - General engineering skills (e.g., mechanical and electrical installation).
    - Plumbing skills integrated with electrical systems.
    - Communication and teamwork abilities, supported by IT tools.

Skills and Employability

The course fosters attitudes essential for workplace success:

- **Generic Workplace Skills:** Teamwork, time management, and customer care.
- **Vocational Knowledge:** Specific to energy systems and their applications.
- **Positive Learning Attitudes:** Encouraging adaptability, problem-solving, and goal setting.

Equality and Inclusion

The design aims to eliminate barriers to participation through flexible learning environments, diverse assessment methods, and inclusive support systems.

Opportunities for Enhancement

To further enrich the course and its delivery:

1. **Practical Modules:**
    - Create integrated workshops on **renewable energy systems**, encouraging hands-on learning with solar and wind technologies.
2. **Digital Tools:**
    - Implement e-learning platforms for skill-building in **energy analytics** and **ICT tools** for system monitoring.
3. **Progress Tracking Systems:**
    - Offer personalized feedback through **activity logs** and **digital performance records** to support learner development.

Course Summary

- **Title:** National 4 Skills for Work: Engineering Skills
- **SCQF Credit Points:** 24
- **Course Code:** C243 74

Mandatory Units (Total: 24 SCQF Credit Points)

1. **Engineering Skills: Mechanical (J16F 74)** - 6 SCQF credit points
    - Focuses on foundational skills in mechanical systems.
2. **Engineering Skills: Electrical/Electronic (J16G 74)** - 6 SCQF credit points
    - Introduces electrical components and circuitry principles.
3. **Engineering Skills: Fabrication (J145 74)** - 6 SCQF credit points
    - Develops practical expertise in metalwork and fabrication.
4. **Engineering Skills: Manufacture and Assembly (J144 74)** - 6 SCQF credit points
    - Teaches manufacturing processes and assembly techniques.

Key Features

Recommended Entry:

Entry is discretionary, but typically learners are expected to demonstrate:

- Interest in engineering.
- Competency in literacy and numeracy at SCQF level 3.
- Aptitude for graphical communication and related skills.

Progression Opportunities:

Completion of this course may lead to:

1. **Scottish Progression Award in Engineering (National 5)**.
2. **SVQs and Modern Apprenticeships** in related engineering fields.
3. Further academic study, employment, or professional training.

Core Skills Certification:

Automatic certification in **Critical Thinking** at SCQF level 4, with opportunities to develop skills in:

- Communication.
- Numeracy.
- Information and Communication Technology (ICT).
- Problem Solving.
- Working with Others.

Links to National Occupational Standards (NOS)

This course aligns broadly with UK National Occupational Standards (NOS) to ensure relevance to engineering employment roles, though with reduced complexity to suit entry-level learners.

- **Tolerance Levels for Practical Tasks:** ±3mm for activities, as specified in Assessment Support Packs (ASPs).

Teaching and Learning Approaches

Emphasis on Experiential Learning:

- Real or simulated workplace settings.
- Role-play activities tailored to vocational tasks.
- Practical assignments and case studies.
- Reflective practices at each stage of learning for improvement.

Core Objectives:

- Develop vocational and workplace-specific skills.
- Instill positive attitudes to learning.
- Strengthen employability, adaptability, and self-reflection capabilities.

Employability Skills:

- Time management, customer care, and workplace ethics.
- Confidence in self-evaluation and lifelong learning.
- Flexible problem-solving and adaptability to change.

Key Rationale

The course supports the **Curriculum for Excellence** by enabling learners to become:

- Successful learners.
- Confident individuals.
- Responsible citizens.
- Effective contributors.

Key Features and Services Provided by SQA

1. Candidate Profile Management:

- Accessible via the navigational panel to:
    - Update personal and contact details.

- Set up and manage job alerts.
- Track the status of applications and modify them as necessary.
- Log out for enhanced privacy after making updates.

2. Exam and Learning Support:

- **Timetables:**
  - Updated exam schedules (e.g., exams from April 25 to June 2, 2025, with results on August 5).
  - Tools like the **Personal Timetable Builder** for individual customization.
- **Study Applications:**
  - **MyExams App:** For timetable customization, adding notes, and syncing with calendars.
  - **MyStudyPlan App:** Helps create a structured revision plan based on personal needs.
- **Resources:**
  - **Modified Past Papers:** Adjusted formats due to past disruptions, including Covid-19.
  - **Specimen Question Papers:** Examples that show structure, question types, and marking guidance.

3. Job Applications and Career Management:

- **Vacancy Portal:**
  - Provides direct access to current job opportunities and application tracking.
  - Tools for withdrawing, amending, or managing applications.
- **Contact Points for Queries:**
  - Candidate Support: General inquiries handled via phone or email.

Core Educational Guidance

1. Skills for Work Courses:

- Focused on vocational learning with experiential teaching methods:
    - **Learning Environments:**
        - Real/simulated workplace activities.
        - Assignments and case studies for practical understanding.
    - **Reflective Learning:**
        - Preparatory planning, regular reviewing, and final evaluations to enhance learning.
- **Core Skills Framework:**
    - Key transferable skills:
        - **Critical Thinking.**
        - **Communication.**
        - **Problem Solving.**
        - **Numeracy** and **ICT.**

2. Equitable and Inclusive Assessments:

- Designed to remove unnecessary barriers:
    - Alternative arrangements for modified exam papers or digital tools.
    - Support for learners needing Braille or other accessibility accommodations.

Recommendations for Enhancements

1. **Enhanced Digital Resources:**
    - Integrate more AI-driven tools like career advisors or dynamic progress tracking systems.
    - Expand functionalities in the **MyExams** and **MyStudyPlan** apps for deeper insights into learning outcomes.

2. **Streamlined Certification Processes:**
    - Automate certificate issuance and provide real-time status updates for learners seeking replacements or awaiting results.
3. **Improved Career Mentorship:**
    - Build a mentoring network accessible through SQA's portal to bridge the gap between education and professional opportunities.
4. **Expanded Communication Channels:**
    - Create live chat options for candidate queries to resolve concerns more rapidly.

Pre-Exam Preparations

1. **Personal Details:**
    - Ensure your school has accurate and updated personal details, including name and address.
    - Changes over the summer should be reported before holidays.
2. **MySQA Access:**
    - Use the MySQA platform to check personal details and exam information.
    - Keep your Scottish Candidate Number (SCN) accessible. It is crucial for exams and can be retrieved via your school or SQA.
3. **Essential Exam Items:**
    - Bring pens (black or blue ink). Avoid gel pens or pencils since they may fade.
    - Verify that you have no prohibited items such as electronic devices or notes.

On Exam Day

1. **Arrival:**
    - Be at the exam location at least 10 minutes before start time.

- Know your assigned desk number if specified by the school.

2. **Prohibited Items:**
    - Examples include mobile phones, smartwatches, tablets, and written notes.
    - Items allowed under specific circumstances (e.g., calculators, dictionaries) must meet SQA regulations.
3. **Invigilation:**
    - Invigilators will monitor the exam environment and ensure compliance with rules.
    - Ask for assistance if unwell or in need of additional materials (e.g., extra paper).
4. **Leaving the Room:**
    - Permission from invigilators is required to leave early.
    - Submit all exam-related materials (e.g., question papers, answer booklets) before exiting.

Writing the Exam

1. **Answer Booklets:**
    - Double-check the subject, level, and instructions on the front cover.
    - Fill out details like name, SCN, and school on all materials.
2. **Answering Questions:**
    - Use black or blue ink and maintain legible handwriting to avoid losing marks.
    - Cross out rough work and avoid using correction tools like fluid or tape.
3. **Calculators and Dictionaries:**
    - Permitted only in specific subjects at designated levels (refer to SQA guidelines).

Conduct and Fairness

1. **Prohibited Behaviors:**
    - Cheating, disruptive behavior, or plagiarism (including unauthorized AI tools) can result in penalties such as loss of marks or cancellation of qualifications.
2. **Exam Integrity:**
    - Be punctual, follow instructions, and submit your work properly to maintain fairness for all candidates.

Post-Exam Support

1. **Results and Appeals:**
    - Results will be available on **August 5, 2025**.
    - An Exceptional Circumstances Consideration Service and an appeals process are available for disrupted exams.
2. **Digital Assistance:**
    - Apps like **MyExams** and **MyStudyPlan**

1. Support Systems and Services

Liaison Team:

- Provides support and advice to every school and college, ensuring smooth delivery of SQA qualifications.

SQA Connect:

- Offers delivery and operational support for qualifications, facilitating accessibility for learning centers.

2. Skills Development through Qualifications

Core Skills:

- A group of five critical skills: **Communication**, **Numeracy**, **ICT**, **Problem Solving**, and **Working with Others**.
- Core Skills are automatically certificated in specific National Courses.

SQA Awards:

- Practical, work-based qualifications recognizing skills in diverse areas, such as:
    - **Cyber Security Fundamentals**, **Customer Service**, **Personal Finance**, **Sports Coaching**, and **Health and Safety in Construction**.
    - Targets learners in specialized sectors and emphasizes practice-based achievements.

National Certificates:

- Designed for learners aged 16-18 to develop transferable knowledge, including Core Skills, with vocational applicability.

Specialized Areas:

- **NQ Statistics Award at SCQF Level 6.**
- **National Literacy and Numeracy Units** focused on foundational skills development.

3. Centre Approval Process

Becoming an SQA Centre:

- **Why Choose SQA?**
    - Affordable, flexible qualifications with industry standards across 30+ sectors.
    - Recognized for quality and assessment expertise.
- **Approval Steps:**
    1. **Pre-application Stage:**
        - Initial discussions and due diligence checks.
    2. **Application Stage:**
        - Submission for systems approval (management processes) and qualification approval (materials/resources).

3. **Review Stage:**
    - Evaluations by Quality Enhancement Managers and subject experts.
4. **Outcome:**
    - Approved centers receive a Center Operating Agreement (COA) and begin registering candidates.

4. Accessible Learning Resources

Exam Support:

- Tools like **MyExams** and **MyStudyPlan** apps to manage timetables and revisions.
- Modified and specimen question papers to suit diverse learner needs (e.g., for National 5, Higher, and Advanced Higher qualifications).

Digital Formats:

- Digital and Braille question papers available for candidates with disabilities or additional support needs.

Past Papers and Marking Instructions:

- Provides access to five years of past papers to aid preparation.
- Includes modified versions catering to disruptions like Covid-19.

5. Research and Development

SQA Research Focus Areas:

- Rebalancing assessment methodologies for practical qualifications.
- Evaluation of **NextGen: HN Design Principles** and **Generative AI Use** in education.
- Key audience feedback to shape qualification delivery.

6. Employment and Opportunities

Careers with SQA:

- Offers roles in various fields like accreditation, qualification design, and support services.
- Promotes values of **trust, progressiveness, and enabling**, with benefits like annual leave and pension plans.

Appointee Opportunities:

- Engages educators and specialists as appointees to support SQA operations.

7. Commitment to Excellence

- **Equality and Inclusion:** Ensures that barriers to education and certification are minimized through flexible assessments and support.
- **Global Reputation:** Over 100 years of expertise in qualifications and assessments, with national and international accreditation.

Enhanced Focus: Electrical Derivation and Integral Applications

Support Systems and Services

1. **Liaison Team:**
    - Provide specialized advice for schools and colleges offering engineering and energy courses with mathematical and technical components.
    - Support integration of **integral and derivation techniques** into vocational modules.
2. **SQA Connect:**
    - Facilitate operational support for practical qualifications, including workshops on electrical system modeling and data analysis through integral sums.

Skills Development Through Qualifications

Core Skills Integration:

- Develop problem-solving and ICT modules for:

- **Electrical Derivation:** Teach learners to derive formulas for power systems efficiency, such as voltage-current relationships.
- **Integrals in Systems Analysis:** Apply integrals for calculating total energy usage or capacitor charge over time.

SQA Awards Expansion:

- Introduce specific awards for **Electrical Engineering Skills**, focusing on:
  - Fundamental **material configuration** techniques.
  - **Integral applications** in system design, such as predicting circuit stability.

National Certificates:

- Include advanced training for learners aged 16-18 in:
  - **Derivational Mechanics** (calculating load-bearing factors).
  - **Energy Configurations** in electrical networks (using integrals to optimize energy flow).

Centre Approval Process

1. **Qualification Approval:**
   - Ensure centers are equipped to deliver assessments involving electrical derivation and integral calculations.
   - Provide clear frameworks for integrating advanced electrical engineering modules into SCQF pathways.
2. **Application Review Stage:**
   - Leverage subject experts to validate course materials covering derivation techniques and integral applications.

Accessible Learning Resources

1. **Exam Support:**

- Develop specialized question papers focusing on **electrical systems** modeling and computational problems involving integrals.

- Include resources like **simulation tools** for circuit design within apps like **MyExams**.

2. **Digital Formats:**

    - Provide interactive learning materials for concepts like capacitor discharge curves and energy consumption models.

Research and Development

1. **Assessment Methodologies:**

    - Rebalance exams to include real-world derivation problems for electrical and mechanical systems.

    - Conduct research on integrating **generative AI tools** into electrical engineering training.

2. **Key Audience Feedback:**

    - Gather data from learners and employers on the effectiveness of applied integral techniques in workplace scenarios.

Employment and Opportunities

1. **Appointee Roles:**

    - Engage engineers and technical specialists to mentor candidates in **electrical system derivation**.

2. **Career Pathways:**

    - Highlight job opportunities in energy analytics, circuit design, and sustainable technologies.

Commitment to Excellence

1. **Equality and Inclusion:**

    - Ensure that learners from diverse backgrounds access materials and assessments related to derivation and integral applications.

2. **Global Accreditation:**
    - Expand international recognition of SQA qualifications with modules featuring advanced mathematical modeling in electrical systems.

1. Support for Students and Staff

- **Privacy and Data Management:**
    - Easily manage personal data, export or delete your account, and access policies.
    - Contact the Privacy Officer for data-related queries or support.
- **File Management:**
    - Each account includes a 100 MB storage limit for private files, with capabilities to upload and manage documents like assessments, thesis work, and resources for ongoing projects.

2. Courses and Learning Plans

Core Development Courses:

1. **Personal Finance Award (SCQF Level 6):**
    - Two key units: **Money Management** and **Personal Finance in Action.**
    - Covers budgeting, insurance, taxation, borrowing, and inflation.
    - Final assessments completed via SQA's SOLAR online platform.
2. **CPD for Centre Staff/Students in HNCs and SVQs:**
    - Tailored for Social Services, Childhood Practices, and Healthcare sectors.
3. **Other Training Highlights:**
    - Developing a coaching mindset.
    - Delivering and marking SQA Advanced Qualification Graded Units.

- Art & Design Question Paper Marking.

Staff-Specific Courses:

- Health & Safety, Dignity at Work, and **Mental Health Matters.**
- Anti-Bribery and Corruption, Protecting Information, and Equalities Training.
- Custom courses like **My Carbon Impact** to enhance sustainability awareness.

3. Equalities and Accessibility Training

- **Equality, Diversity & Inclusion Training:**
  - Overview of the Equality Act 2010 and its impact on SQA operations.
  - Tools for designing inclusive assessments and accessibility compliance (e.g., Web Content Accessibility Guidelines - WCAG).
- **Corporate Parenting and Care Experience:**
  - Empowers staff to understand their responsibilities and support care-experienced learners.

4. Specialized Staff Development

- **Organisational Roles:**
  - Procurement Contract and Supplier Management (CSM).
  - Data Governance and Business Continuity Training.
- **Line Management Training:**
  - Fundamentals for aspiring or current line managers.
- **Virtual Meeting Facilitation:**
  - Best practices for hosting and managing effective online collaborations.

5. Accessible Learning Tools

- **Mobile App:**
    - Enables on-the-go access to SQA Academy courses and learning resources.
- **Reports and Progress Tracking:**
    - Browser session summaries and grades overviews for tracking progress.

6. Assessment and Exam Guidance

- Modified and specimen papers for National Courses (e.g., National 5, Higher).
- Access to digital and Braille question papers for inclusivity.
- Preparation tools like **MyExams** and **MyStudyPlan apps.**

7. SQA's Commitment to Excellence

- Over 100 years of experience in qualification design and delivery.
- Transparent approval processes for becoming an SQA Centre, ensuring quality in the management and delivery of qualifications.

The information provided offers a detailed range of resources, training opportunities, and organizational support available through **SQA Academy**. Here's an organized breakdown for better understanding and practical application:

Core Training Programs

Workplace Skills Development

1. **Remote Working:**
    - A comprehensive guide designed for SQA staff transitioning to or managing remote work environments.
2. **Change Management:**
    - For staff involved in organizational development, this course provides tools to manage and implement change effectively.
3. **Clear and Confident Writing:**

- Modules to develop audience-focused writing skills, improving communication within and outside the organization.

4. **Managing Stressful Situations at Work:**
    - Supportive training aimed at handling workplace challenges with resilience and professionalism.
5. **Mental Health Matters:**
    - Aims to build awareness of mental health, offering guidance on seeking and providing support.
6. **Resilience Training:**
    - Equips staff with strategies to foster resilience and adaptability in the workplace.
7. **Virtual Meeting Facilitation:**
    - Practical tips and best practices for hosting effective virtual meetings with colleagues and stakeholders.

Equalities and Inclusivity

1. **Equality, Diversity, and Inclusion Training:**
    - Covers the Equality Act 2010 and its implications for SQA staff and responsibilities.
2. **Designing Inclusive Assessments:**
    - Provides tools for creating fair and accessible assessments for diverse learners.
3. **Digital Accessibility Training:**
    - Focuses on improving accessibility in digital content, using tools and guidelines like **WCAG** and **Universal Design for Learning (UDL)**.
4. **Care Experience and Corporate Parenting:**
    - An introductory course for understanding and supporting learners with care experience.

Specialized Staff Roles

Leadership and Management:

- **Line Management Fundamentals:**
    - Aimed at developing essential skills for current or aspiring line managers.

Organizational Roles:

- **Candidate Advice Line (CAL) Training:**
    - Prepares volunteers to support SQA candidates effectively.
- **Workplace Investigations:**
    - Mandatory training for conducting workplace investigations with accuracy and integrity.
- **Procurement Contract and Supplier Management (CSM):**
    - Designed for procurement teams, but accessible to all staff to build understanding.

Technical and Operational Support

1. **E-Marking Helpdesk Training:**
    - Provides technical and procedural support for e-marking operations.
2. **Business Continuity:**
    - Offers insights on maintaining operations during disruptions.
3. **Data Governance Training:**
    - Ensures proper handling of organizational and learner data.

Podcasts and Learning on the Go

- **Academy Podcasts:**
    - Monthly discussions on digital advancements, featuring organizational insights.

Equal Opportunities and Accessibility

- **Freedom of Information and Records Management:**
    - Ensures compliance with legal and ethical standards for data management.
- **Equality Impact Assessments (EIAs):**
    - Aids in policy design by considering impacts on individuals with protected characteristics.

Qualifications Development

- **Assessment Development Fundamentals:**
    - For vocational qualifications, ensuring alignment with SQA standards.
- **Joint SQA/External Agencies Training:**
    - Collaborative modules to enhance national and international qualification efforts.
- **NextGen: HN Evaluation:**
    - Focuses on modernizing and evaluating Higher National qualifications.

Key Highlights for SQA Staff

1. **Tailored Development Plans:**
    - "Your Development, Your Choice" empowers staff to design their learning paths.
2. **Sustainability Focus:**
    - "My Carbon Impact" builds awareness of environmental responsibility within organizational practices.
3. **Health and Safety:**
    - Courses addressing workplace dignity, anti-bribery, and stress management.

Course Overview

- **Course Title:** National 5 Skills for Work: Energy
- **SCQF Credit Points:** 24
- **Course Code:** C258 75

This course is divided into **3.5 mandatory units** and **0.5 optional units** selected from a choice of three.

Mandatory Units (Total: 21 SCQF Credit Points)

1. **Energy: An Introduction (J12W 75)** - 6 SCQF credit points
    - Overview of energy systems and principles.
2. **Energy: Domestic Wind Turbine Systems (J12Y 75)** - 6 SCQF credit points
    - Practical and theoretical understanding of wind turbine systems for domestic use.
3. **Energy: Domestic Solar Hot Water Systems (J130 75)** - 6 SCQF credit points
    - Exploration of solar water heating technologies and their domestic applications.
4. **Energy: Employability and Careers (J12X 75)** - 3 SCQF credit points
    - Focus on career planning and employability skills tailored to the energy sector.

Optional Units (Choice of 1, Total: 3 SCQF Credit Points)

- **Energy and the Individual (J131 75):** Understanding energy consumption and sustainability at a personal level.
- **Energy: Oil/Gas Extraction (J133 75):** Insights into the oil and gas extraction process.
- **Energy: Conventional Technologies and the Grid (J132 75):** Examines traditional power technologies and grid integration.

Recommended Entry

- Entry is at the discretion of the learning center, ensuring flexibility in learner eligibility.

Progression Opportunities

Completion of the course enables progression to:

1. **National Progression Awards (NPA)** in energy or engineering.
2. **National Certificates (NC)** in Further Education.
3. Direct training or employment opportunities within energy-related fields.

Core Skills Certification

Automatic certification of key core skills at **SCQF Level 4**, including:

- **Working with Others:** Emphasis on teamwork and collaboration.
- **Critical Thinking:** Developing analytical and problem-solving abilities.
- **Planning and Organizing:** Preparing learners for operational and project management tasks.
- **Working Co-operatively with Others:** Building synergy in professional environments.

Alignment with National Occupational Standards (NOS)

The course aligns with NOS for the UK Renewable Energy Sector, covering essential competencies such as:

- General engineering and mechanical skills.
- Integrated electrical installation and plumbing skills.
- Practical communication and IT-based collaboration.

Learners are also introduced to generic employability skills, including:

- Teamwork.
- Ability to learn and follow instructions.

- Self-organization and planning.

Learning and Assessment Approach

The course uses **experiential learning** strategies, ensuring hands-on exposure through:

- Real-world or simulated workplace scenarios.
- Role-playing activities to contextualize vocational skills.
- Case study analyses and practical assignments.

Equality and Inclusion

The course design ensures accessibility and inclusion for all learners, utilizing flexible teaching and assessment methods to address individual needs.

. Introduction to the Awards

- These awards were validated under SQA's **Design Principles** in March 2005, replacing the previous HNC and HND Engineering: Electrical qualifications.
- They aim to maintain credibility while serving the needs of learners, higher education institutions, employers, and professional organizations.

2. Rationale for Revisions

Electrical Engineering Scope:

- Focus on traditional subjects within electrical engineering, including **power**, **plant operations**, and **installation techniques**.
- Limited electronics content solely to underpin studies in specific branches of electrical engineering.

HN Engineering Frameworks:

- Introduced as a broad structure encompassing **common core units**, principles/technology sections, and optional components.
- **Benefits Include:**
    - Meeting diverse sector needs with flexible qualifications.

- Enhancing progression opportunities between HNC, HND, and degree-level studies.
- Efficient delivery of shared units across multiple awards.

3. History and Market Research

- **HNC History:** Offers foundational skills for entry-level engineering roles.
- **HND History:** Provides deeper technical expertise for advanced engineering positions.
- **Market Research Findings:** Highlight the growing demand for qualified electrical engineers and alignment with modern industry trends.

4. Aims of the Awards

General Aims for HNC and HND:

- Equip learners with critical engineering knowledge applicable to practical scenarios.
- Promote transferable skills, including problem-solving, teamwork, and communication.

Specific Aims for HNC:

- Introduce fundamental electrical principles and technologies for immediate application.

Specific Aims for HND:

- Build advanced knowledge and leadership competencies to prepare learners for professional roles or further academic pursuits.

5. Qualification Structure

HNC Structure (G7TA 15):

- **12 unit credits**, covering foundational electrical engineering principles.

HND Structure (G7TC 16):

- **30 unit credits**, integrating advanced electrical topics with practical applications.

Graded Units:

- Allow learners to demonstrate their ability to apply core knowledge to complex scenarios.
- Assessment rationale emphasizes relevance to industry expectations.

6. Delivery and Assessment Approaches

Content and Context:

- Real-world applications emphasized through experiential learning.
- Coursework integrates core principles with technological advancements.

Assessment and Re-assessment:

- Flexible methods for evaluating practical skills, including written tests, projects, and case studies.
- Structured re-assessment protocols to ensure learner success.

7. Guidance for Centres

- Accommodates learners with disabilities or additional support needs through tailored approaches.
- Encourages open and distance learning to broaden accessibility.

8. Articulation Arrangements

- Strong links to other engineering awards enable seamless progression to higher-level qualifications or industry roles.

Integrating Calculations and Derivations into the HNC/HND Structure

1. Introduction to the Awards

- Highlight the role of advanced mathematics (integrals and derivatives) in addressing complex electrical engineering challenges, such as analyzing circuit behavior or optimizing plant operations.

2. Scope and Framework for Revisions

Electrical Engineering Scope:

- **Power Systems:** Use integrals to calculate energy consumption over time in power systems.
- **Plant Operations:** Implement derivation to analyze rates of change in operational efficiency.
- **Installation Techniques:** Employ mathematical models to determine material requirements and optimize wiring configurations.

HN Engineering Frameworks:

- **Common Core Units:** Embed topics like size configuration, component selection, and material optimization through mathematical analysis.
- **Optional Sections:** Allow learners to explore advanced applications of integrals and derivatives in electrical installation or power distribution.

3. Enhancing Learning with Market Trends

- **HNC Level:** Introduce foundational tasks such as:
    - Deriving load capacities for simple circuits.
    - Applying integrals to calculate total system output.
- **HND Level:** Progress to advanced scenarios like:
    - Using derivation to design voltage regulation systems.
    - Configuring materials based on performance analysis.

4. Aims of the Awards with Mathematical Applications

General Aims for HNC and HND:

- Equip learners with quantitative methods to solve real-world engineering problems.
- Emphasize transferable mathematical skills, such as data interpretation and predictive analysis.

Specific Aims:

- For HNC:
    - Introduce basic calculations for circuit design and energy balance.
- For HND:
    - Focus on deriving equations for electrical field analysis and integrating systems for renewable energy management.

5. Qualification Structure with Technical Focus

HNC Structure:

- Units could incorporate topics like:
    - **Size Configuration:** Determining wire dimensions using resistance equations.
    - **Basic Integral Applications:** Calculating cumulative electrical charge in systems.

HND Structure:

- Advanced topics could include:
    - **Derivational Methods:** Calculating dynamic changes in electrical systems.
    - **Integral Applications:** Energy optimization in multi-phase systems.

6. Delivery and Assessment Approaches

Content and Context:

- **Real-World Applications:** Create assignments involving energy audits or system optimization using mathematical models.
- **Integration with Technology:** Leverage software tools for modeling integrals and derivations in engineering scenarios.

Assessment:

- Use problem-based assessments requiring learners to:
    - Configure electrical systems based on integral calculations.
    - Derive equations to predict circuit performance.

7. Guidance for Centres

- Provide resources for teaching integrals and derivations in practical engineering contexts.
- Support for learners needing additional assistance with mathematical components.

8. Articulation Arrangements

-

his framework clearly demonstrates how **integrals** and **derivatives** can be seamlessly integrated into **HNC and HND Electrical Engineering qualifications** to address real-world energy and power challenges. Here's how the outlined points can be further refined and detailed:

1. Introduction: Advanced Mathematics in Electrical Engineering

- **Integrals in Circuit Analysis:** Calculate the total energy delivered by a circuit over time or determine the area under a power-time curve to assess system efficiency.
- **Derivatives in Optimization:** Use rates of change to evaluate system performance, such as voltage drop or current fluctuation in real-time operations.

2. Scope and Framework Applications

Power Systems:

- **Energy Consumption Modeling:** Apply integral formulations like: $ $E = \int P(t) \, dt$$ Where P(t)P(t) is the power as a function of time and EE is the cumulative energy.

Plant Operations:

- Use derivatives to analyze operational trends: $$\frac{d\eta}{dt}$$ Where η\eta represents system efficiency, and the derivative measures its change over time.

Installation Techniques:

- **Mathematical Models:** Compute material specifications like cable length, resistance, and voltage tolerance using foundational equations (e.g., Ohm's law).

3. Integrating Market Trends

HNC Level Tasks:

- Derive load equations for single-phase circuits using simple relationships: $$I = \frac{P}{V}$$ Where II is current, PP is power, and VV is voltage.

HND Level Scenarios:

- Explore advanced integral applications for multi-phase energy systems, calculating total power generated: $$P_{\text{total}} = \int_{t_1}^{t_2} \sum_{i=1}^n P_i(t) \, dt$$

4. Mathematical Applications Aligned with Aims

HNC Aims:

- **Introduce Core Formulations:** Familiarize learners with basic integrals for energy and derivatives for efficiency monitoring.

HND Aims:

- **Complex Analysis:** Derive equations for electrical fields and implement integrals to study renewable energy systems.

5. Structuring Mathematical Concepts

HNC Topics:

- Size configuration techniques to determine optimal wiring dimensions using resistance formulas: $$R = \rho \frac{l}{A}$$ Where RR is resistance, ρ\rho is resistivity, ll is length, and AA is cross-sectional area.

HND Topics:

- Analyze dynamic changes in current using derivatives: $$\frac{di}{dt} $$ Apply integrals to calculate total charge: $$Q = \int I(t) \, dt$$

6. Practical Delivery and Assessment

Real-World Applications:

- Assign tasks where students calculate the efficiency of energy systems or optimize material usage for installation projects.

Technological Integration:

- Leverage software like MATLAB or AutoCAD to model and solve integral-based and derivational engineering problems.

Assessment Examples:

- Derive equations for voltage regulation in circuits, ensuring optimal power distribution.
- Perform integral calculations to determine the energy stored in capacitors.

7. Support for Centres

- Provide step-by-step resources for teaching integrals and derivatives in practical contexts.
- Include simulations and workshops to bridge theoretical learning and hands-on practice.

8. Articulation Pathways

- Showcase how foundational mathematical competencies align with higher qualifications, such as degrees in electrical or renewable energy engineering.

’s craft a structured response to integrate **formulas, calculations, and size reasoning** within the context of **engineering science** and **electrical assessments**, tailored to the **SQA framework**:

Background: Engineering Science in Electrical SQA Assessments

The integration of engineering science principles into **SQA electrical assessments** aims to provide students with practical and theoretical understanding. These assessments encourage the application of mathematical models, formulas, and reasoning to solve real-world challenges.

Key Topics and Formulas

1. Size Calculation: Wire and Component Dimensions

- **Ohm’s Law:** $$ V = IR $$ Where VV is voltage, II is current, and RR is resistance. This formula aids in determining wire capacity based on load requirements.
- **Resistance Formula:** $$ R = \rho \frac{l}{A} $$
    - ρ\rho: Material resistivity.
    - ll: Length of the wire.
    - AA: Cross-sectional area.
- **Practical Application:** Calculate the optimal wire size for minimizing energy losses in a power distribution system.

2. Energy and Power Calculations

- **Power Calculation:** $$ P = VI $$ Where PP is power, VV is voltage, and II is current.
- **Energy Consumption:** $$ E = P \cdot t $$
    - EE: Total energy consumed over time tt.
    - Used for analyzing power usage in electrical systems over specific intervals.
- **Integral Energy Calculation:** $$ E = \int P(t) \, dt $$

- For varying power systems, this integral calculates cumulative energy.

3. Component Sizing: Capacitors and Transformers

- **Capacitor Energy Storage:** $$ E = \frac{1}{2}CV^2 $$
  - CC: Capacitance.
  - VV: Voltage across the capacitor.
- **Transformer Sizing Equation:** $$ P_{\text{out}} = P_{\text{in}} \times \eta $$
  - η\eta: Transformer efficiency.
  - Balances input and output power.

Reasoning Framework in Assessments

1. **Problem Identification:**
   - Clearly define the engineering scenario (e.g., sizing a cable, analyzing power loss).
2. **Formulation:**
   - Apply relevant equations to establish relationships between variables.
3. **Calculation:**
   - Substitute known values and compute results.
4. **Evaluation:**
   - Interpret results, compare with industry standards, and identify optimizations.

Integration in SQA Assessments

- **Core Units:** Introduce size calculations, wiring configurations, and energy system analysis using these formulas.
- **Graded Units:** Assign complex problems like sizing multi-phase transformers or analyzing efficiency in renewable systems.

- **Optional Units:** Allow exploration of advanced topics like integral applications in renewable energy grids.

15.1 Course Highlights: Fundamentals of Control Systems and Transducers

- **Unit Code:** HT1R 47, SCQF Level 7
- **Assessment Structure:**
    1. **Written Paper:** A two-hour closed-book exam assessing theoretical concepts like transducer functionality and control systems design.
    2. **Laboratory Assignment:** Practical task requiring the construction and demonstration of a transducer-based circuit/system, followed by a detailed written report.
- **Mathematical Foundation: Engineering Mathematics 3** is a prerequisite, ensuring familiarity with mathematical models such as derivations and integrals applied to control systems and transducers.

Advanced Certificate and Diploma in Electrical Engineering

SCQF Level 7 Certificate:

Focuses on foundational electrical engineering principles:

- Electrical Systems in Hazardous Environments.
- Inspection and Testing of Low Voltage Installations.
- Programmable Logic Controllers (PLC).
- Engineering Mathematics and Power Electronics.
- Three Phase Induction Motors and Electrical Installation Skills.

SCQF Level 8 Diploma:

Builds deeper expertise for advanced applications:

- Analogue and Digital Electronics, Quality Management, and Industrial Plant Maintenance.
- Synchronous Machines and Electrical Motor Drive Systems.

- Advanced topics like **Switchgear and Protection**, **Standby Systems**, and **High-Level Engineering Software**.
- Computer-aided Electrical Installation Design.

Unit-Specific Insights: High-Level Engineering Software (HP41 47)

Purpose:

- Equips learners with the ability to design, implement, and verify software solutions for electrical systems.
- Enhances skills in system design, flowcharts, documentation, and programming using conditional and iterative loops.

Learning Outcomes:

1. Write, test, and document programs using **linear** I/O commands.
2. Develop multi-way selection algorithms with **logic operators**.
3. Create iterative loops using structures like:
    - **FOR...DO** loops.
    - **REPEAT...UNTIL** conditions.
    - **WHILE** iterative statements.

Assessment Methods:

- Creation of a **portfolio** documenting program development and testing results.
- Practical assignments to assess competency in applying software solutions to real-world engineering problems.

Recommended Delivery Techniques

Content:

1. Integrate **control systems theory** with transducer construction tasks.
2. Apply mathematical concepts like:

- Derivation: Evaluate rates of change within control processes.
- Integral Calculations: Assess total energy output or cumulative system response over time.

Assessment:

- **Logbooks or Reports:** Reflect the development process and outcomes for practical projects.
- **Tailored Assignments:** Provide unique specifications for each candidate to ensure originality and individual understanding.

Platforms:

- Use microcontroller systems or standard PCs with I/O ports to develop and test software programs.

Mathematical Applications

Control System Equations:

- Derive system response functions: $$ \text{System Output} = \int \text{Input Function} \, dt $$
  - Analyze how changes in input affect output over time.

Programming Tasks:

- Develop iterative loops for dynamic systems:
  - **Example: FOR...DO loops** to manipulate electrical signal arrays: $$ \text{FOR } i \text{ in array, OUTPUT(i) = FUNCTION(i)} $$

SQA Advanced Unit Specification

HT1R 47, Fundamentals of Control Systems and Transducers (SCQF level 7) 15

The formal assessment for the Unit will consist of a both a written assessment paper lasting

two hours and a laboratory assignment lasting two hours.

The written assessment paper will be conducted under closed-book conditions and you will

not be allowed to take notes, textbooks etc into the assessment. You will sit this assessment

paper at the end of the delivery of the Unit.

The laboratory assignment will require you to construct and demonstrate the operation of a

circuit or system that incorporates a transducer. This will be carried out during a two hour

laboratory session at a suitable time during the delivery of the Unit. On successful completion

of the practical aspects of this assignment, you will be required to submit a written laboratory

report.

Engineering Mathematics 3 SQA Advanced Unit or equivalent.

QA Advanced Certificate and SQA Advanced Diploma qualifications provide practical skills and theoretical knowledge that meet the needs of employers.

The SQA Advanced Certificate in Electrical Engineering at SCQF 7 covers areas such as:

Electrical Principles

Information Technology

Three Phase Induction Motors

Power Electronics

Inspection and Testing of Low Voltage Electrical Installations

Programmable Logic Controllers

Electrical Systems in Hazardous Environments

Control Systems

Further Mathematical studies

Electrical Installation Skills

Engineering Quality

The SQA Advanced Diploma in Electrical Engineering at SCQF 8 builds on the knowledge and skills of the SQA Advanced Certificate and covers areas such as:

Inspection and Testing of Low Voltage Installations

Programmable Logic Controllers

Electrical Systems in Hazardous Environments

Analogue and Digital Electronics

Quality Management

Electrical Installation Skills

Industrial Plant Maintenance

Synchronous Machines

Electrical Motor Drive Systems

Three Phase Induction Motors

High Level Engineering Software

Additional Control Systems studies

Power Supply Circuits

Switchgear and Protection

Standby Systems

Electrical Installation Design: Computer Aided

Advanced Mathematical studies

Qualification structure

SQA Advanced Certificate in Electrical Engineering

Group award code: GP6D 47 (96 SCQF credit points)

SQA Advanced Certificate in Electrical Engineering at SCQF level 7 consists of 9 mandatory units.

SQA Advanced Diploma in Electrical Engineering

Unit title: High Level Engineering Software

Unit code: HP41 47

Unit purpose: This Unit is designed to give candidates knowledge and understanding and apply

basic software engineering concepts to solving electrical and electronic engineering problems that

require a software solution. The emphasis in this Unit is on writing and testing and documenting I/O

programs using the basic structures available in most high level languages.

This Unit provides the candidates with the opportunity to develop skills in system design (top-down

design), detailed design (using flow charts or program design language), implementation in the design

in a high level language and verification of the design. This Unit also allows the candidates to develop

their communication skills by generating the documentation for the designed solution.

On completion of the Unit the candidate should be able to:

1 Write, test and document linear programs using I/O statements.

2 Write, test and document I/O programs using conditional statements.

3 Write, test and document I/O programs using iterative loop statements.

4 Write, test and document an I/O program, incorporating subroutines.

Credit value: 1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications

Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an

SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.

Recommended prior knowledge and skills: Candidates should have a basic knowledge

of electronics, logic operations and number systems. This may be evidenced by possession of a

Higher in Electronics or the following National Qualification Units D134 11 Combinational Logic or

E9LG 11 Computing in Engineering 1 or D980 11 Programmable Systems.

Core Skills: There may be opportunities to gather evidence towards Core Skills in this Unit,

although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: This Unit was developed for the SQA Advanced Certificate/Diploma in

Electronics award. If the Unit is used in another Group Award(s) it is recommended that it should be

taught and assessed within the context of the particular Group Award(s) to which it contributes. The

platform for this Unit may be a micro-controller system or a standard personal computer with access

to I/O ports.

SQA Advanced Unit Specification

Unit HP41 47: High Level Engineering Software 2

Assessment: It is recommended that this Unit be assessed via a logbook or portfolio and

programming projects or assignments that cover the knowledge and skill presented in each Outcome.

Centres should take every reasonable effort to ensure that reports are the candidates' own work. It

may be possible to issue each candidate with a slightly different specification of equal complexity, or

alternatively where there is a suspicion of copying or plagiarism, an appropriate response may be to

interview candidates. A checklist should be used to record oral evidence of the candidates'

understanding.

Centres are recommended to develop appropriate checklists to support the assessment requirements

for each of the knowledge and skills items. Centres are also recommended to produce a marking

schedule based on the Evidence Requirements listed indicating clearly the required content of the

report. Candidates who do not meet the standard should be obliged to correct and resubmit their work.

SQA Advanced Unit Specification

Unit HP41 47: High Level Engineering Software 3

Unit specification: statement of standards

Unit title: High Level Engineering Software

Unit code: HP41 47

The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements

are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the

Knowledge and/or Skills section must be taught and available for assessment. Candidates should not

know in advance the items on which they will be assessed and different items should be sampled on

each assessment occasion.

Outcome 1

SQA Advanced Unit Specification

Unit HP41 47: High Level Engineering Software 4

Evidence Requirements

Evidence for the Knowledge and/or Skills in this Outcome will be provided on a sample basis in the

form of a portfolio. The candidate’s response will be judged to be satisfactory where evidence

provided is sufficient to show that the candidate is able to:

Write, test and document ONE non-linear I/O program involving:

¨ conditional statements with logic operators

¨ multi-way selection statement

Outcome 3

Write, test and document I/O programs using iterative loop statements

Knowledge and/or Skills

¨ Flowcharts/pseudo code: FOR…DO, REPEAT…UNTIL, WHILE… loops

¨ Statements: FOR…DO, REPEAT…UNTIL, WHILE…

¨ Loops to manipulate data arrays:

— output array data to a port

— read port data into an array

¨ Testing of iterative loops

¨ Test plan and actual results

Evidence Requirements

Evidence for the Knowledge and/or Skills in this Outcome will be provided on a sample basis in the

form of a portfolio. The candidate’s response will be judged to be satisfactory where evidence

provided is sufficient to show that the candidate is able to:

3. Write, test and document ONE non-linear program involving an

electrical engineering, providing a pathway for learners to build essential skills and theoretical knowledge applicable across a wide range of sectors. Here's an organized breakdown of the **experimental career topics** within the **SQA Advanced Certificate and Diploma in Electrical Engineering**:

Core Topics in Electrical Engineering

Certificate-Level Topics (SCQF Level 7):

1. **Electrical Principles:**
    - Focus on foundational concepts such as Ohm's Law, circuit analysis, and power relationships.
2. **Information Technology:**
    - Introduces IT tools for electrical engineering applications, including data analysis and simulations.
3. **Three-Phase Induction Motors:**
    - Covers motor operation principles and applications in industrial settings.
4. **Power Electronics:**
    - Explores converters, inverters, and devices that transform electrical energy efficiently.
5. **Inspection and Testing of Low Voltage Installations:**
    - Practical skills for ensuring safety and regulatory compliance.
6. **Programmable Logic Controllers (PLC):**
    - Teaches the use of PLCs in automation and industrial control systems.
7. **Electrical Systems in Hazardous Environments:**
    - Safety procedures and technology for handling dangerous operational scenarios.
8. **Control Systems:**

- Introduces feedback mechanisms, automation, and systems regulation.

9. **Further Mathematical Studies:**
    - Includes integrals, derivations, and formulas relevant to electrical engineering challenges.
10. **Electrical Installation Skills:**
    - Practical skills for installing and maintaining electrical components and systems.
11. **Engineering Quality:**
    - Emphasis on project quality control and adherence to engineering standards.

Diploma-Level Topics (SCQF Level 8):

Building on certificate-level knowledge, these units focus on advanced applications:

1. **Inspection and Testing of Low Voltage Installations:**
    - Advanced methods for testing electrical systems to ensure performance and safety.
2. **Programmable Logic Controllers:**
    - Complex programming techniques for industrial automation.
3. **Analogue and Digital Electronics:**
    - Delves into mixed signal systems and their applications in modern technology.
4. **Industrial Plant Maintenance:**
    - Strategies for ensuring optimal functionality and longevity of industrial equipment.
5. **Synchronous Machines and Electrical Motor Drive Systems:**
    - Advanced study on machines and motor systems used for power generation.

6. **High-Level Engineering Software:**
    - Programming and simulation of electrical systems using structured software development methods.
7. **Additional Control Systems Studies:**
    - In-depth exploration of dynamic system control and optimization.
8. **Power Supply Circuits and Switchgear Protection:**
    - Design, operation, and safety mechanisms in high-voltage electrical circuits.
9. **Standby Systems:**
    - Focus on backup power technologies and system reliability.
10. **Electrical Installation Design (Computer-Aided):**
    - Integration of CAD tools to optimize installation layouts and designs.
11. **Advanced Mathematical Studies:**
    - High-level mathematics including differential equations and integral calculations for complex engineering problems.

Applications and Career Implications

1. **Industrial Design and Maintenance:**
    - Learners gain hands-on skills to manage electrical systems in sectors such as manufacturing, energy, and automation.
2. **Control Systems and Automation:**
    - Strong emphasis on feedback mechanisms, PLCs, and software solutions to develop efficient, automated systems.
3. **Safety and Compliance:**
    - Essential skills for inspection, testing, and operating electrical systems safely in hazardous environments.
4. **Renewable Energy and Advanced Engineering:**

- Units focused on power electronics, motor drive systems, and standby systems align with industry trends like energy efficiency and sustainabilit

his structured breakdown of the **SQA Advanced Certificate and Diploma in Electrical Engineering** emphasizes both foundational and advanced topics, preparing learners for practical applications in a range of industries. Let's dive deeper into **calculation, size configuration, material selection, integrals, and derivations** within these frameworks:

Mathematical and Scientific Applications in Electrical Engineering

Certificate-Level Applications (SCQF Level 7):

1. **Electrical Principles:**
    - **Calculation Example:** Apply **Ohm's Law**: $$ V = IR $$
        - Use this to calculate voltage drop across a circuit or adjust current for safe operation.
2. **Further Mathematical Studies:**
    - **Integral Applications:**
        - Compute cumulative electrical energy: $$ E = \int P(t) \, dt $$
            - Analyze time-dependent power consumption in circuits.
    - **Derivations:** Monitor system efficiency: $$ \frac{dP}{dt} $$
        - Evaluate rates of change in power output over time.
3. **Control Systems:**
    - Use feedback mechanisms modeled through differential equations: $$ \text{Output} = \int \text{Input Signal} \, dt $$
4. **Electrical Installation Skills:**
    - **Size Configuration:** Calculate optimal wire dimensions using: $$ R = \rho \frac{l}{A} $$

        - Design systems with minimal resistance to improve energy efficiency.

Diploma-Level Applications (SCQF Level 8):

1. **Power Supply Circuits and Switchgear Protection:**
    - **Integral Calculation:**
        - Assess total energy provided by a circuit over specific intervals: $$ E = \int_{t_1}^{t_2} P(t) \, dt $$
2. **Advanced Mathematical Studies:**
    - Solve complex circuit behavior using **differential equations**: $$ \frac{di}{dt} $$
        - Calculate current changes in dynamic systems.
3. **Electrical Installation Design (Computer-Aided):**
    - Integrate **CAD tools** to calculate load distribution and efficiency across installations.
4. **High-Level Engineering Software:**
    - Program iterative loops for dynamic circuit analysis: $$ \ text{FOR } i \text{ in array, OUTPUT(i) = F(i)} $$

Applications and Career Implications

1. **Industrial Design and Maintenance:**
    - Tasks such as transformer sizing or motor control optimization require integral energy calculations and material configuration analysis.
2. **Renewable Energy and Sustainability:**
    - Solar and wind systems demand equations for voltage regulation and maximum power point tracking, ensuring efficient energy utilization.
3. **Safety and Hazardous Environments:**

- Mathematical models ensure compliance by predicting potential faults and mitigating risks in hazardous installations.

This well-structured breakdown emphasizes both mathematical rigor and practical applications in **electrical engineering**, preparing learners for diverse career paths and technical challenges. Let's seamlessly integrate the mention of systems like **laser printers, scanners, PCs, and mark sheets** into the existing framework.

Extended Applications: Integrating IT Systems in Electrical Engineering

Certificate-Level Applications:

1. **Information Technology in Electrical Systems:**
   - **Laser Printers and Scanners:** Use laser printers and scanners to document installation plans, circuit designs, and mark sheets for assessments. These tools aid in visualizing layout designs and reporting results.
   - **PC Integration:** Harness computers for simulations and modeling of electrical systems, ensuring efficient and reliable circuit performance.
2. **Control Systems with IT:**
   - **Feedback Mechanisms:** Combine computer systems with control units to analyze input signals through integrals, e.g.: $$ \text{Response} = \int_{t_1}^{t_2} \text{Input Signal}(t) \, dt $$
3. **Mark Sheet Calculations:**
   - Automate grading systems using software to calculate scores dynamically based on numerical inputs and predefined formulas.

Diploma-Level Applications:

1. **High-Level Engineering Software:**
   - Develop iterative programs for managing energy system behavior, leveraging advanced PCs connected to scanners and printers for system documentation: $$ \text{FOR } i \text{ in array, OUTPUT(i) = Function(i)} $$

2. **Advanced Mathematical Studies:**
    - Use integral applications in CAD designs to optimize layout for electrical installation: $$ \int \text{Voltage}(t) \cdot \ \text{Current}(t) \, dt $$
3. **Power Supply Circuits and Standby Systems:**
    - Configure systems with integrated IT tools to assess dynamic changes in energy output, ensuring backup systems function efficiently during transitions.

Applications in Practical Settings:

Documentation and Reporting:

- Utilize **laser printers** and **scanners** to digitize designs and generate mark sheets for electrical engineering assessments, fostering detailed tracking and quality assurance.

Industrial Automation:

- Integrate IT systems for seamless data transfer between **programmable logic controllers (PLCs)** and control mechanisms in hazardous environments.

Quality Management:

- Maintain compliance by automating checks for electrical installations using IT-enabled devices like PCs and laser scanners.

15.1

[Type the company name]

Project

Workbook is a compilation of adapted formal assessment brief career-project exhibition

Tshingombe tshitadi tshingombe

[Pick the date]

Absract : scie bono career center librairie career mentoring discovery assessment engineering studie fiedl and technologie

1. Purpose: explanation career center expo science journey of self discovery.

Workbook is a compilation of adapted formal assessment brief career

-project exhibition

-Name : tshingombe Tshitadi

-Date :17/04/2024

Section A: subjects and studies

Section B: skills and ability strengths

Section C:my career interests

Section D: preferred field of study

Section my personality profiles

F:work values

.-design assessment:

-1.subject entry: A,

A:[career electrical technical]--[mathematics informatics :B]---[motoring :C]--

[Saqa award degree level: D]-- [Engineering electrical: E] --- [panel wiring: F], [Skill inventory: G]--[functionality transfer skill] and outcome’s. ---

[Engineering technologies science studies [research Education and training arts audio visual technologies communication architecture Ana construction].

-subject :key design

-10. print "a"

-20. print "b"

-30. print "c"

-40. print "d"

-50. print "e"

-60. print "f"

-70. print "g"

-80. Print. "h"

-90. print "I"

-100.print "j"

-110.print "k"

Sub

_____

120. input "a1"

130. input "b1"

140. input   "c1"

150. input   "d1"

160. Input. "e1"

170. input   "f1 "

180. Input. " g1"

190. Input.   "H1"

200. Input. "i1"

210. input   "j1"

220. input "k1"

Sub

_____

230. output ("a1"+"b1"+"c1")

240.output ("d1"+"e1"+"F1")

250.output ("g1"+"H1+"l")

260. Output (j)

Sub

_____

270. if ;{"a1"+"b1"+"C1"}=1

280. Else="t "_subject =next step

290.if ;{"d1"+"e1"+"F1"}

300.else" t " subject :next step

310.{" g1" +"H1"+"l"}

320.else

330. If and . subject step =1

340. Show :outcome display

.350. Next. .string will

_____

Projection: technologie outcom project career:

Design circuit principle career explain diagram

_____

Design logograms:.

Designed Algorigramme.

Designed table:

-a

Design technologie career psychometric Education:

Variable

-education training

Sequence series port impulsion contact mother feeder .

Career total guidence learning CVS switch term work value way cluster selected box peer

-

Logic process

A=011111111111

B=001111111111

C=000111111111

_____; convert binaries .dec

D=000011111111

E=000001111111

F=000000111111

G=000000011111

H=000000001111

I =000000000111

J =000000000011

K=000000000001

L1=. 1

L2=. 1

L3= 1

L4=. 1

-Educ technologie career psychometrical

:

Education logic processes,code module

Mode phase switch Variance; term

XA=011111111111

XB=001111111111

XC=000111111111

;sum =XA+XB+XC

XD=000011111111

XE=000001111111

XF=000000111111

;sum=XD+XE+XF

XG=000000011111

XH=000000001111

XI =000000000111. ; sum =xD+xh+xi

Xj= 000000000011, sum

Xj=000000000001

; Product switch

.-Reder subject outcome: module week term allocation .phase transition outcome level career: elementary, intermediary, senior. Current

-Conductor .semi -conductor switch key career learning: logic binaries code

Module subject average career guidance:

-Module career (sum "a"+"b"+"c") ;(sum "d"+"e"+"f");("g"+"h"+"I").;

- Task career step operate logic input output module learning sum. Module phase elementary, phase subject ,

Modulation scaling block career input ,output phase

-Phase A,phaseB,phaseC,phaseD,phaseE,

PhaseF,phaseG,phase h,phase I,

-Activities:key learner

_____

Module: ligth resistor. Induction learner bulb :

Module :rectifier redresseur phase angle ,diode operator phase sum career

5v logic 1,0r logic 0 volt

Diode code encode display :

Resistor:

Module : phase career amplificator career gain .module transistor, % good average

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Module disc triac thyristor integrator circuit .

Display subject . % good

.line linearise

Control logic analysis

asservissemnt:lineare band :

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Loop input output level grade: sum compare career: equivenlent job input output: dividers job analyze function job task. Switch. Binary

.task: modulation course subject entry criteria job selected key (phase a. Subject electrical) statement goal tech industry, psychotic electrical drawing project, method measure instrument. Electrical machine, electricity industries, mechanical workshop lab, language. Actuality electrical grade bulletin service: .education technologies total posting job output internet ship level grade 12 (and) /logic mathematics informatique ms do's window ms work windows, outcome certified statement award , attestation test motoring initiation special diesel essential vehicle, statement , telecommunication, pedagogue technical subject prep. Math physic drawing technical technologies mechanic electrical logic,rwiten sleek expression civism, electrotech , psycho pedagogie,didactic special ,intro psychopedagogie, orientation professional, electromechanic machine elect thermodyn chemical metalurgi statistics,

---

Task phase :Ccma seta council labour , outcom -security

Task phase:Engineering saqa n diploma

subject engineering n diplome interpretation log : assessment

-panel electrical wiring

Subject statement outcome: course module mathematics, engineering science,trade theory electrical , engineering drawings,:electrotech electrotech. National trade diploma

, industrial electronics trade , average, assessment police ,

career :

Graduate program: Alison , Microsoft, schedule :,

Ccma labour security officer,policy intelligence

Records

_____

-modulation 3month 90 days allocation credit 360: term .

Outcom career transmission generation

Graduate:post senior

Total: faculty course total computing

-guidence outcom generation: engineering senior :engineering transmission dispatch custom +Dev op information ITC mathematics data science network path+special research motor +trainer training seniors educator technic ,job post subject , generalist A1,2,

-sum a,b,c=. ,sum ,d, e,f=. sum= g,h,I:

Asservissemnt synchronisation phase level equivenlent level grade,phase Angela 3month linear non linear scale synchronise , equivenlent trade, professional

- task module reader

Modulation ,activity

-Research operationel:method research career implementation career join venture subject course tendered minimum close contractor quotation compagny key learners step A+B+C

Module

-research phase oscillator local signal A B .command network services

-display register key .plate .display line pin address.vertical map, horizontal map AX=100000000000,AY=10000000000,

Az=10000000000, , base synch

Amplificator operationel Ax,Ay,Az

Resolve variance ,covariance equation linear ax+by+c=0, .ax°+by+c...ax+by+cz=O..

Dimensionnement algorithm,scale

-Research operationel

-lecture reading module activities career outcom disc task call recall career module term asservissemnt lineare detector convert base binairy.decimal disc detection Ax=1000000000,recall accumulation register key Ax,A,yAz,key to flip flop amplificator lecture career move file read lecture captor analyser task .tap recording memory heater accumulation career.

Research map(xa,ya,az) operationel career work outcome :transited job duty functional line Project key :

Transfer :research intelligence artificial genie mil ,civil ,technical security instruction key duty ,safety health labour display. Career

intelligence re Engineering, outcome job opportunity scaling , coordination ordination axes x ,y,z, Cartesian projection find job map transition

2. Referral librarie casebook photocopy project

DISCOVERY CAREER ;

-JOB DISCOVERY LIBRARIE; BOOK JOB INVENTORY JOBCAREER CAREER

-LEARNER DISCOVERY CAREER: JOB TOPIC CASE BOOK COMPAGNY

-FACILITATOR DISCOVERY CAREER: JOB TOPIC CASE BOOK COMPAGNY AGREEMENT

-LEARNER NAME: ……

-FACILITATOR:
.....

NAME:
.....;.....

-MODERATOR NAME:
.....

-ASSESSOR NAME:
.....

INSTITUTION NAME:
.....

HR:RESOURCE FRAMMEWORK: CLOSE COMPAGNY

LIBRARIE PUBLIC JHB:

SCIEBONO CAREER CENTER LIBRARIE:

COST PROJECT FILING:

Tools assessment librarie and material assessment project librariecareer center

ENTRY CRITERIA /TASK BOOKING MAGAZINE

ID ORDER BOOKING

TOPIC BOOKING

COST BOOKING

TOPIC PROJECT COST COMPAGNY DESIGN/ COMMENT REVIEW

WEB SITE:

Conversation opened. 1 unread message.

15.2 his comprehensive workbook and project framework focuses on career discovery and technical education, blending logical analysis, electrical engineering, and applied mathematics to prepare learners for success in technology-driven fields. Here's an organized **background overview** and **analysis** based on the shared content:

1. Purpose and Overview

- **Objective:** The project outlines a **science journey of self-discovery**, guiding learners through career exploration in fields like **engineering**, **psychometrics**, and **technology-based education**.
- **Design Framework:**
    - Career assessment topics segmented into structured phases.
    - Use of logical programming, binary coding, and modular systems to identify career pathways and technical competencies.

2. Key Sections in the Career Workbook

Section A: Subjects and Studies

- Introduces critical fields of study, including **electrical technical skills**, **informatics**, and **engineering technologies**.

Section B: Skills and Strengths

- Assesses proficiencies in key areas like:
    - Electrical wiring and panel configuration.
    - Mathematical reasoning and problem-solving.
    - Logical operations for input-output analysis.

Section C: Career Interests

- Focus on technical fields including:
    - Electronics and mechanics.
    - Design and testing of circuits and systems.

Section D: Preferred Fields of Study

- Encourages focus on areas such as **control systems**, **psychometry**, and **education technologies** for career alignment.

Section E: Personality Profiles and Work Values

- Uses psychometric variables to align learners' work ethic and learning preferences with their preferred technical fields.

3. Engineering and Technology Modules

Career Focus Areas:

- **Electrical Engineering Modules:**
    - Circuit design principles, resistor operations, and amplification techniques.

    - Real-world applications of transistors and triacs in system integration.

- **Education Technology Modules:**
    - Psychometrics applied to learning outcomes and career transitions.
    - Coding processes for system analysis and data management.

Logical Operations:

- **Binary System Conversions:**
    - Converts binary to decimal to evaluate system processes.
    - Example binary codes:
        - A = 011111111111
        - B = 001111111111
        - Sum: A+B+CA + B + C

Control Logic Analysis:

- **Feedback and Loop Systems:**
    - Loops (e.g., FOR...DO, WHILE) to process sequential data in input-output mechanisms.
    - Task: Evaluate job equivalency using logic-driven data sets.

4. Structured Career Exploration

Technology and Career Psychometrics:

- Uses **logical flowcharts** and **modular coding** to evaluate:
    - Learning styles.
    - Technical competencies.
    - Career aspirations.

Phase System:

- Divided into modular stages (A through I), each focused on:
    - Elementary concepts (e.g., resistor logic).
    - Intermediary systems (e.g., rectifiers, amplifiers).
    - Advanced integrations (e.g., thyristors, phase circuit analysis).

5. Programming and Algorithms

System Design:

- Logical steps for input-output evaluations and process automation:

re’s a detailed continuation of **System Design and Logical Programming** with **calculation, integrals, derivations, size configuration, and weighting in phase systems** for electrical engineering:

System Design and Logical Programming

1. Input-Output Evaluation Steps

1. **Input Variables:**
    - Collect data from electrical components:
        - **Resistors:** Capture resistance (RR) and current flow.
        - **Capacitors:** Measure capacitance (CC) and stored energy.
        - **Diodes:** Analyze voltage drops and current flow directions.
    - Design modular systems where these components interact dynamically.
2. **Processing Logic:**
    - Binary algorithms can evaluate system behavior:
        - Assign binary states to each variable (e.g., 1 for "ON", 0 for "OFF").
        - Calculate interactions using conditional statements.

2. Key Applications of Mathematical Operations

Integral Applications:

- **Energy Calculation:**
    - For capacitors and power systems, compute cumulative energy stored or delivered: $$ E = \int P(t) \, dt $$
        - P(t)P(t): Power as a function of time.
        - Application: Analyze total energy consumption or storage over time.

Derivations:

- **Rate of Change in Phase Systems:**
    - Derive current or voltage changes in real-time systems: $$ \frac{dI}{dt} \, \text{or} \, \frac{dV}{dt} $$
        - II: Current.
        - VV: Voltage.
        - Application: Dynamic analysis in feedback systems to stabilize outputs.

3. Size Configuration in Electrical Systems

1. **Wire Sizing:**
    - Optimize wire dimensions to minimize energy loss: $$ R = \rho \frac{l}{A} $$
        - RR: Resistance.
        - ρ\rho: Resistivity of the material.
        - ll: Length of the wire.
        - AA: Cross-sectional area.
        - Use for selecting efficient conductor materials and minimizing power loss.

2. **Component Size Weighting:**
    - Assign weighting factors to prioritize component efficiency:
        - E.g., Capacitor size impact on system response vs. circuit stability.
        - Balance performance with cost and material availability.

4. Phase Systems and Modular Analysis

1. **Modular Phase Configuration:**
    - Divide systems into logical phases for analysis and implementation:
        - **Phase A-C:** Elementary components like resistors and inductors.
        - **Phase D-F:** Intermediate modules including rectifiers and amplifiers.
        - **Phase G-I:** Advanced integrations such as thyristors and phase controllers.
2. **Phase Weighting Logic:**
    - Use binary sequences to model system stability across phases:
        - Assign binary configurations (e.g., A=011111111111A = 011111111111).
        - Process data transitions between phases to evaluate outcomes.

5. Algorithm for System Evaluation

Programming Steps:

1. **Input Variables:**

16.11. Research Plan Overview

Provisional Project Topic:

- **Implementation Framework Policy:**

- Focuses on engineering circular assessments, education technology, electrical subjects, and qualification standards.
- Aims to connect entrepreneurship, industry needs, municipality systems, and government initiatives through structured frameworks.

Project Categories:

- Innovation in **energy systems** and **urbanization models** via Eskom and City Power Johannesburg.
- Science-based approaches to align education and training outcomes with industrial demands.

2. Introduction

- Defines roles of key stakeholders:
  - **City Power Municipality:** Focus on electrical supply and urban energy sustainability.
  - **Eskom Entrepreneurs:** Support public-private collaboration in energy and industry.
  - **Educational Institutions:** Bridge teaching, learning, and apprenticeship training for future-ready skills.
- **Problem Defined:**
  - Integration challenges between rural and urban systems in technology innovation.
  - Need for standardized frameworks to enhance learner competency, intellectual growth, and career transitions.

3. Research Objectives

Key Questions:

- How can learner phases (beginner, intermediate, senior) align with college and workplace graduation goals?
- What frameworks resolve industrial maintenance problems while fostering human-material integration (robots, technology, energy systems)?

- How can timeframes and scheduling mitigate load-shedding impacts on industry and education outcomes?

Research Aim:

- Synchronize education systems with industrial needs, ensuring adaptability, administrative functionality, and systemic improvements.
- Create innovative models for workplace training, regulatory compliance, and graduate readiness.

4. Engineering Goals

Design Goals:

- Establish entry models for engineering learners based on levels (Grade 1-12, N1-N6, University).
- Develop mandatory frameworks like qualification standards (NQF 1-3) and graduation policies for career integration.

Outcome Goals:

- Align city-wide assessments (portfolio-based, formative, summative) with employment metrics.
- Enhance competency ratings and recruitment post-graduation.

5. Methodology

Materials and Equipment:

- **Human Resources:** Educators, trainers, engineers.
- **Technical Tools:**
    - Electrical materials (panels, meters, circuits).
    - IT systems (robots, USB ports, computational tools).
    - Stationery and electronic records (exercise books, logbooks).

Procedure:

- **Step-by-Step Tasks:**

- Framework design, policy implementation, and feedback loops.
- Career module scaling and learner induction adjustments.
- Synchronize human-robot interfaces across systems (access cards, database management).

6. Ethics

- Incorporates **policy and safety standards:**
  - Regulatory frameworks for education and workplace health.
  - Prevention of learner induction errors and breakdowns affecting industrial systems.
- **Focus Areas:**
  - Synchronicity between learners and operational systems (robot/human collaboration).
  - Safety protocols for time-sensitive industrial and educational environments.

7. Literature Review

Time Frame Management:

- Explore how break times, load shedding periods, and energy disruptions affect:
  - Productivity in industries.
  - Educational delivery in schools and colleges.

Orientation and Supervision:

- Develop supervision systems for project shifts (day/night schedules).
- Legal practices ensuring equitable workplace standards.

esearch. Career, Eskom, city power municipality , department education, science expo,college institutes school., project

1.RESEARCH PLAN:

- ENGINEERING TYPE,AND SCUENCE COMPUTER
- NAME : TSHINGOMBE TSHITADI

-PROVISIONAL PROJECT TOPIC: IMPLEMENTATION FRAMEWORK POLICY COLLEGE AND SCHOOL ENGINEERING CIRCULAR ASSESSMENT POLICE EDUCATION TECHNOLOGY TEACH AND TECHNOLOGY ELECTRICAL SUBJECT SCHOOL QUALIFICATION LEVEL IN ENTREPRERSHIP AND INDUSTRIE SOCIETY COMMISSIONING AND GOVERNMENT MUNICIPALITY TEAM TRAINING WORK GRADUATION ENGINEERING TIMEFRAME .ST PEACE COLLEGE SCHOOL ORIENTATION GUIDE MANUEL POLICY -PROVISIONAL PROJECT EXPO CATEGORY..:

- INTRODUCTION:

the innovation define city power municipality government institutes city jhb delivery matter supply public and private urbanization energy electrical , And define Eskom entrepreneurs commission delivery society government industrial delivery public private energy electrical commissioner . .the school and college institutes private public define by Education department teaching learner science engineering apprentice and training and assessment of learner intellectual -need or problem defined : the research implementation problem need to resolve discovery rural and actually technology innovation industrial to integrate system to standard system knowledge support natural sciences design generated analyze combined sheet from school assessment Portfolio college career outcome Assessment information formative and Summative to workplace workshop mentoring components system to be improved or functionnning to the municipality and entrepreneurs industrial to promovate graduation in workplace. -research questions: Ask factor job career outcome transition phase learner phase exhibition phase teach beginning, intermediate,seignor get college junior cadet minim functions graduate chief post generation size industrial , development outcome machine industrial problem industrial maintenance support, manufacture support technical science actual system machine computer system news technology robot science energies need career outcome integration human and material support to resolve demand factor in humans size outcome tendered bid and material resource capacity product integration. to resolve team timeframe operational system month daily diary , -research time frame : Project ,importance time frame allocation time table research engineering and science electrical implementation break time load shedding time industrial loss gain resource human material energetic ,time table adaptation system team synchronization, asynchronous system regulation time table periodic alternative or direction energy production system cost metering production human time frame to resolve movement frequency response of team step task project in the structure, resonance learner ,metering learner teacher, resonance learner and system robot actually must be synchronized slot frequency, control loop wizard

register access card system movement personal in out robot system entrepreneurs synchronization system. speed level up date need to control by human robot system technology. -Aim : overview : in the review system career learner induction or error implementation framework regulatory mandatory learner human resource in time time frame must adjustable system and resolve registered system administration standard synchronization and stability adaptor system delay register , model rwin city ,wring commission adapted illegally institutes or college need to training system and adapted in system upgrade update register circular policy engineering planning, -Engineering goals: Design , facilities learner Engineering entry model ,years learner up date ,up grade years 2023 to 2018 in college up date and new institutes and news outcyactual tendered job city. Class model grade 1 to grade 12 level n 1,6 college level , university level , N1 to n6, NQF 1,nqfto 3 qualifications framework n engineering, grade occupation certificate seignor council certificate Engineering, category, frequency term 1,2,3,4 semester move file Portofilio assessment student register Poe's docket case indicator job logine , compare scaling,compare ,comtency rating , Synchronous induction learner speed slot intellectual quotient learner entry exhibition, efficiency learner ,average, Probability learner gate job integrity post learner Portofolio learner award learner , probably learner job equity engineering and electrician daily meeting. More less .induction error proefficuence more , Goal close tendered minimum graduat learner posted salary recruitment post , maintenace poor, ,-algorith achieve , probably.

- METHOD: MATERIAL AND EQUIPMENT: methology specific guidelines assessment formative Summative rebruc,tools assessment learner and teacher ,time table allocation file student file school..workers file employment database file training job and emploie job , humain. Material stationery information Manuel and automatically system machine laptop computer ,panel system ,design,execise book log book, journal account book, drawing sheet book,office documents wallet book,bank card register office database employment book, need, Engineering electrical material,panel projection permit office workplace register government industrial register social,policy defense security register logistics support, space power. Electrical generation transmission,distribution metering measure tools ,robot it system Port USB , Panel, equipment scaling.office study.

-PROCEDURE : description Learner and teach , Education design technology support science ,and enysupport,

- team step task operation activities career,
  Relate argument statement button Operationel preliminary task.method motivation automation ,register system input output student workclass scaling class career class ,yes statement class yes,

implementation print and yes , workplace Eskom or city power available learner place yes synchronisation or inspection department education or labour gov yes adapted system accountability yes restore file system yes , , relay delay yes compare yes test control loops system yes flip file equity and statement post yes, teach system yes up date course lecons activity yes compare resolution certificate yes occupation yes qualifications yes compare systeme, questions custome system ask resolve yes meet yes training ask component framework yes activate yes implementation yes system restore maintence support system, Data systems collect and memorise award. -ETHIC : completed safety. Circulum policy framework regulatority,quality council trade council engineering, circulum policy, Education regulation regularity irregularite material fault default, insurance quality , Health injury or health time frame synchronisation,asynchronous learner , network transmission,generation distribution system synchrone,real time , images time frame safety,time frame framework stability learner , induction learner error learner outcom no meeting or learner gate damage system or break time table material stationery workplace college affect workplace industrial and municipality breakdown job injury body or robot system industrial registration move inactive receive message or not send or not incomplete,support no survey real no arrival place asynchronous

LITERATURE REVIEW

-time frame : project work plan Plan orientation industrial and supervision. . orientation industrial : schedule project shift days night Management supervisor Humain resource Management system information Legal practice

Date : State,: post :

- teacher ' mentor comment and suggestion:

-ABSTRACT: the implementation framework circulum knowledge circulum policy engineering planing product improvement contractual agreement with register trainer and consultant engineering electrical and computer science engineering static material drawing need discovery Channel partner ways together with the quality plan on being there for system need system generated undergoing next year's and analyse to zero loadshedding or Rental system information recommand theory practice of anticipating dangers social media teach, -Name : tshingombe

- school name : St peace college.
- grade : 12/ level 6,n 6 Region Gauteng.
- PROJECT TITLE: IMPLEMENTATION -ABSTRACT : -PURPOSE: -METHODE:.

-project management: building for scientific mentor, school,

- views school attending, Project submitted.
- customer used.
- application award certificate . Grade expose youth.
- project creating .
- school management projects Development companies.
- social, science. -agricuture animal, prody agriculture, Biomedical chemistry analysis,
- computer data management data science network,St earth science , atmosphere ,climate science,energy, productivity, engineering, biomedical, engineering chemistry, math, algebraic ,plant sciy, physics, astronomy,science,matter,science ,matter ,optic,

-Types of project: scientific investigation: reseat questions and a hypotese, observations and ,

- it involves Colle ,
- engineering computer design , process , according,criteria,build test redesign,retest proto,

-mathrmatic, theoretical, Print explot,

- quantity hypothy
- creative identify what.
- interest focus specii topic
- determy significant, value. Topics literature review.
  Creating ,ethic ,response research plan , Project book, Take pictures.

Teacher mentor name

Teach engineering/ and Education technology. News are Cree city and commission

Teach engineering youth Reflections daily Career mentor -lesson plan: -Nano technology and water What is nanotechnology, How small arbobject nano technology, Where does our water come from , How can nanotechnology make safe to drink. Activity 1,2,3 extension activity.

, -nano technology and mining , wath is natechnology , wath are the danger of mining,how is nanotechnology being used to make safe , activity,2,3 .. -nanotechnology and energyb,where does ours energy come from,non renewable and renewable energy source ,how can nanotechnology help to build better solar panel , activities,1,2,3:.. .nanometre..

- the are used nano technology science very small ,object ,,.. .. ..discy, ..

- apparatus , investigation, write an investigation Questions, write a hypotese for your investigation, procedure for the investigation ..make sure that your hypotheses give a clear idea of step you need ,
- connect your equipment so that you have build circuit shown diagram, beginning by including as completed the circuit observe brightness of the ligthbub, now,observe the brightness of the ligthbub with this shorter length,, torch ,wire pencil lead,wire,, now decrease the length pencil lead that has been included in your circuit once , observe the brigth of the ligthbub with this shorter length of pencil lead ,record your observations, -analyse your data. Assume the brigthness current and resistance do you notice from observations, -Write a conclusion. Write a clear conclusion to your investigate.. Activity: Describe the mining danger ,, -activity : in group of 5 ,6 learner design and draw a poster showing how nanotechnology is being used to build gas sensors for mines,
- make your poster as clear and colourful as , .
- you teach will assess your using criteria.
- poster is colour and creative , 2 marks,poster shows original idea 2 marks, poster is clearly presented , 2 marks,information on poster is informative. 2 marks, group work learner were included 2marks ,total 10 marks. 2.how to build yourself a bright technical future.
- considering a technical career,..
- let s get down to work ,
- how do I pay for .. Technical and artisanal not so low skilled job fact skilled, Revolution age material age skill.. Myth and facts about technical careers . Myth choosing a technical course will lead a low paying job , career regards status compare,gate stuck on your career ,technical career are not for women ,is dirth work,there is not room for creativity in technical career Fact : a well qualified technicians or artisan is high demand and will earn good salary , need RSA job technical low, women do justas these career, workplace need clean , Engineering challenge are practical problem and many need creation nthar where qualifirv,, .are you fascinated by how something,piece make it up together,do you prefer to make things instead of reading aboutg ides ,doubyou enjoy solving puzzles and problem,does working in team make happy ,would you like to run your business ones day a career as artisan or technicia ,, mechanitechnique , electrical,civilengineering technologist , Let see what you are good at , it can difficult to decide what your are good at what career you want doing is to use a theory designed, six broad type, realistic,investigative,artistic ,social,entreprise, conversation, occupation personel, -Are you realistic,are you pracal, CA you fix electrical things,do like explore machine, wath score -are you investigative , are inquisitive ,can you things abstractly, do you like to explore ides,,analytical solve math problem use computer wath score,

- are you artistic are you creative , sketch draw or paint all ,solve problem in original way, intituive ,use intutii.read stories,play and poetry,imagine,,are you social are you friend can you teach or train other,do like to use social or interpersonal,are you enterprises,are you self confidence,star project ,do you like to make that affect,
- so what now ,how do you get there , Registered Education institut NQF qualifications. Career career Pathways, ,school need subject ,wath exactly the Engineering technology field ,electrical,career pet for part..
- birthday planetarium, science activity, ,erupting apples, planetarium show,science show, graphite circuit

Climbing wall package, Subject in the national curriculum statement grade ,10-13.. Learning field ,elective subject, you need to have selected subject, subject refer to the , -comulsory subject ,home language n,first language,pure math , Human social studies ,physical computer, business comeerce managent ,service manufacture eny, design technology, electrical technology,eny graphics design,mecanic

Engineering it... discovery Computer , training , development and support services to existing or prospective , club house safe creative space to learner aged ,prepares learners for full participation in the 4IR and provide exposure to coding ,robotics ,sebt development, graphic design,3 d design ,2 D and 3 D modelling, animation,video production, basic computing , virtual art , year full time development program 180 unemployment youth aged training including cisco,it Ccma ,ccna security Linux,IoT ,C,C++ , python , essential skills and career readiness, instructor training centre essential ,ccna routing and switching ,ccna security ,ccna cybersecurity operation,to existing or prospective , custome accreditation custome 3,_4 day module ,word,excell,access,Nd power point ms office,speciistr training,it also digital literacy, skills, certiport examination ms office , specifical, delivery fundiy depending learner full standard ,..

University. Undergraduate, how do you conscientise students about 4 in their learning ,reality ,Google self driviy,

- what about the research output research , ..where are you going create new facility .
- complementary roles engineer, design inovate ..role in perspective, , Career psychological services focus counseling therapy psych education ,career resource ,CV job interview gradust,

to

purpose: 3 ,,phase synchronous machine an electromechanic energy conversion device operate speed of rotating magnetic field , synchronous machine ,bases energy, synchronisation generator, , NS = 120f/ p , number

of poles the machine , Work.principlr, -key features, synchronous motor do not starting self , synchronous machine double excited machine because it requires two input supplies ones stator , synchronous machine,operate at constant speed, called , syncy generator can produce voltage magnitude ,machine lagging,leading unit, syncy motor voltage : equation of synchronous motor, V =En+Is(Ra+jxs)., - v = voltage Police ,En back end , I a armature current ,Ra armature resit, resultant voltage difft between the voltage applied V,and back EMF, Internal angle, ER, and tan @= X's/Ra..,back EMF generated , En= ka.alpha,NS.. En=v normal excitation, logging power factor, input power : input power synchy motor is given pin = v.Ia.cos ,,,pin = √3.v.L.I cos ,where ,, .mechanic power in motor ,Pm=Eb.Ia.cos (a-alpha) ,,,Pm= Pin - Is.Ra..Pin= √3.VL.I.L cos ..is load angle.gross torque,synchry,speed , stepper motor ,B= Ns-Nr/NsxNr)*360..step angle of rotation ,ms = number of stator , resolution of stepper motor , , loady regulation= change output,no load , output volt,, fault calcule breaker busbare ,IB= , I/X's=1/x+1/x..

- Implementation and stability inspection, cycle of training ,step take long time
- psychomotor : and physical requirements of a job analysis survey rate the functionalite requirements of job rating class ,job analysis,process, resultat process , resultating primary resultat job session news , category data, work ,instruction , function,analyse ,PC to collect data and draw , construction job tools ,build task tools up data ,,
- function in the real world introduction student to function ,function machine, functionalite machine easy ngrap, machine input goes same thing happened rules ,input predict output determine the input, input , metaphor by setting large cardbox machine mystery rules ,teacher student can create rules teacher created spread sheet machine,,,, -Synchronous system asynchronous effect .phase transition Asynchron 3 space 90,120 , wave ,, -understand the gradient function slope slip tangent point derivative ,vector function Probly calcul gradient loss function,,gradient scalar function ,have two function partial derivatives, -Maintenance during operation abnormal yes, breakdown yes, yes scheduling, order , maintence, database yes,yes period, mid term maintence scheduled, monthly equimt inspection ,. Implementation leader Education problem counter mesirw , trainer, equipment specific,inspection educay yes,inspection trait yes,self , leader Education yes,
- factory dry battery process, phenomenon batteries failling , revolving table, description loss balance,

-implementation ,system analogy,I/0 control investy application of embedded control controller to real time control algorithm input analogy output implo a closed loop ,how feedback use linearized ,non linear process and resultat in zero steddy , generate pwm outputs to implent variable motor ,supply

voltage, Implementation a tachometer operational using pic 32 timer ,develop the CP program code to Implementation a pi controller moving average digital filter , monitoring display, reading embedded mechatron ,basic circuit pin microship pic , microprocessor, hardware basy trainer board workstation ,PC running windows,MC1 Linus ,12 v motor switch ,5 v,4A DC power supply,software ,mplabx plib cross ,
Project takeaway how read Nalog compare implent a pwu capture period measure , fundamental digital,open loop and closed ,process control ,

- fundamental concept ,unit introduction process electromechanic I/0 , automate process control engineering deal,automai process,open loop, DC motor speed counter record , Transfer functy magnitude response,phase shift ..

-Synchronous , .time period phase move transition job work vibration robotics system Mass spring force oscillator ... Function , mx''+cx''+kx=f(t)..non zero setui mass friction k is the spring constant,f(t), Fourie series periodic function, f(t)= for.cos(wt).

- resonay, control nature frequency, control logic ,circuit ,
- frequency constant , capacitance,static displaced,static voltat resonance ,piezoelectric voltage constant .

Synchronouse robot dynamic, kinematics and control ,nomencenture ,operator , kinematics, introduction position represent coordinator , cylindrical, coordination,linear velot,reprensation velocity Cartesian ,rotation mayris ,active ,passive rotation passive rotation, elementary rotation,representation Euler angles, unit , time derivatives of rotation ,generality coordination ,mat lab ,rigid body velocity and acceleration,task space ,co-ordinate corresponding effect, f

- forward kinematics for planar robot ,are and effector ppsity, function rotation matrix c -% GETULANG XJZ from option matricr (c) extract x ,yyz Euler angler from % rotation matrices,% ,author,
- xy = a tan 2.(c(2,3),((3,3)); Y=atan 2 (c(1,3),sqrt((1,1)^2+(1,2),c(1,1) Ph=[x,y,z] Lifting job ,,,

Synchronouse. Low of conservation of energy, mechanical energy (kE+PE), conservation, energie. KEi+PEi+ wnc+OE= kEf+PEF+ Oef Kinetic eny is key work conservation, PE, done by conservation forct energy are included, equation, problem,step 1. Determine the system,step potential energy conservation,KEi+PEi=KEf+PEf, step step enerivariouse ,object phenom.efficience, Eff= useful energy or work out/ total energy input.... - Total change in energy of systu, Δu=Δq(v2-v1),, Δu=IΔtv (I=Δa/Δt) Total kinetic energy of system energie of system conservation,u = kinetic t, kinetic t=i.vΔt.conductor electric field greadui eneri,colliu t charge total charge

vibrat of Tom heat energy conductorP=E/t.. Energy ability work done =energy spent power what meant DP/St, f= dp/ St, St/ St (m.v) , solv equation ,,L.di/St+RT=E°coswt..dE.dt=o demonstrate pendulum force u= m.gh dE/St>forcing constant function..

-eskom smart meter infrast up grade programme relit supply empower them control consumer,meter consultation process meeting block tariff,meter renewable,customer interface prepay,remote .information meter5,, -advance measure approach methode, complex energy systems monitoring and control kpi,based on integration of based of active power ..

Lesson teach note: What's is nanotechnology: is NM one billion the length of matter to pir perspective, diameter average bacty 2500nm long material 100nm nano matert,,,nono scat material, involved the product manipulation nanoscale material products ,nanosciet consists discot and character, -activity fields nanotechnology, @0 years research plan research ...

- the electronics industry,wath is distinct need between electrical appliances and electronics electrical appliances and t flow of charged particles electronics in this metal conductor copper wire ,found electrical cord home appliances non metallt conductor ketler ,electron ,non metallic conductor semiconductor found cellphone.. -nanoelectronics current and future applications.
- origins of nanoelectronics: ,100 atoms ,
- computer hips semiconductor industry: CPU ,central pro easing units found computer, transistors embedded in silicon, calculatioy per second required keep ,replaced out data technology tubes 1960 s , accordiy to Moore's low named after ,PC transistor ,45 NM ,process 47 million nanoscy transistor distrt accross 26 mm ,compone computer,, Components found quick retrial storage data volaty data abscen d use carbon nanotubes , computer switch data retention,data recovery during power cuts,
- molecular electronics: decrease in size components molecular emerge task performance ,capacitors in electronics device ,capacitor store information, molecular been investigated act incredibly single electron .
- organic light emitting diodes OLEDs : television and computer monitor ,electronic device Thea days particularly handled device mp3 player ,ligth emirtur ,OLED organic light. Emitting diode 100nm packed betwt conducting film called electront film voltage causes energy ,compare OLED ,screen film, product,
- touch screen : technology as found in many table ,palm computer ,smart phones and news laptop,works , digital signal to control device interwar , layering of conductive film of indium tri oxide Ito , which conductor relay the ,x- y coordonne to processing components of the device ,smart ,ITO , technology. 1 nanowire can

produced to high conductive transparent subnano wire network allowt hegher screen brightness ,with option of producing flexible screen Ito film,

- improvement batteries: Devet in battery,lio batteries ,smart phone ..
- risk and safety issue: unique physicochemical properties of nanomaterial electronics industry , safety humait,nano party,microsct,mass ratio risk asst , hazardous nanopt,national occupation health ,incorporate.
- key issue to consider : renewable water energy have lagged ,, chip manufacture capabilities.
- future risk assessment: The future nanotechnology in the electronics industry:
- conductor,:material that can transmit heat ligth ,electrical charge in case electrical conductor electrical conductivity mesure of electrical current move through material it can see. As opposite of resistance,
- semi conductor : a material that can conduct electricity.under specifical circulum voltage current flowing through common material .
- led technologie: ligth emitting diode are semie conductor device emit light as current from anode to cathode .to cathode energy from of photon ,is release electron through the led device bprocess called electroluminescence,
- transistor , semiconductor terminal current flowi between b, -capacitor ,an electronic components store electrical charge consiste two conductive plate separate ,
- electrodes , the anode is the electrode oxidation reaction takes place reduce,
- graphene. Two dimensional one atom carbon atom bonded hexagonal the crystalline alloyrip structure a pure element ,pencit lead ,carbon nanotubes,hallow cylinder consistent,nested comprised of carbon atoms ,spherical carbon fulleren composed entirely carbon atom in bKk shapp also called buckbakk and buckmnjsterful,they commonly consist 60 or 79 carbon ,physicJ property , of substance relating to both it's physical chemical.

-Metering screen ,ITC manufacture nanotechnology transmission component automate ,, Synchronouse system , synchronous intelligence it ,

One attachment • Scanned by Gmail

tshingombe fiston tshingombefiston@gmail.com Sun, Aug 13, 2023, 12:19 PM

to info, ictservicedesk, info, info, INFO, postmaster, president, PJIYANE, Tenders, Cynthia.Tshaka, modiba.d, study, sarsdebtmanagement2, RECRUITMENTSCD, support, TSHINGOMBEKB, me

Skip to main content Editing Your Profile Learner's Guide • Do you want live notifications when people reply to your posts? Editing Your Profile Learner's Guide Dec 2020 1m 1 year later ogollah_josephat_ojoTeachers Dec '21 Iam writting to you from kenya.I have managed to get an account for participation in this year’s expo but I can’t fill the fields fully because the schools and regions dont include kenya.How can my students be helped to participate? 2 years later libaso_mdyogoloTeachers 3d Good day I have been trying to go to the next level but it kept on reverting back to the school name, everytime I go back. tshingombe_tshitadi1 7m engineering electrical tshingombe tshingombe_tshitadi1 1m Research. Career, Eskom, city power municipality , department education, science expo,college institutes school., project

1**.RESEARCH PLAN:**

- ENGINEERING TYPE,AND SCUENCE COMPUTER
- NAME : TSHINGOMBE TSHITADI -PROVISIONAL PROJECT TOPIC: IMPLEMENTATION FRAMEWORK POLICY COLLEGE AND SCHOOL ENGINEERING CIRCULAR ASSESSMENT POLICE EDUCATION TECHNOLOGY TEACH AND TECHNOLOGY ELECTRICAL SUBJECT SCHOOL QUALIFICATION LEVEL IN ENTREPRERSHIP AND INDUSTRIE SOCIETY COMMISSIONING AND GOVERNMENT MUNICIPALITY TEAM TRAINING WORK GRADUATION ENGINEERING TIMEFRAME .ST PEACE COLLEGE SCHOOL ORIENTATION GUIDE MANUEL POLICY -PROVISIONAL PROJECT EXPO CATEGORY…:
- INTRODUCTION: the innovation define city power municipality government institutes city jhb delivery matter supply public and private urbanization energy electrical , And define Eskom entrepreneurs commission delivery society government industrial delivery public private energy electrical commissioner . .the school and college institutes private public define by Education department teaching learner science engineering apprentice and training and assessment of learner intellectual -need or problem defined : the research implementation problem need to resolve discovery rural and actually technology innovation industrial to integrate system to standard system knowledge support natural sciences design generated analyze combined sheet from school assessment Portfolio college career outcome Assessment information formative and Summative to workplace workshop mentoring components system to be improved or functionnning to the municipality and entrepreneurs industrial to promovate graduation in workplace. -research questions: Ask factor job career outcome transition phase learner phase exhibition phase teach beginning, intermediate,seignor get college junior cadet minim functions graduate chief post generation size industrial , development outcome machine industrial problem industrial maintenance support, manufacture support technical science actual system machine

computer system news technology robot science energies need career outcome integration human and material support to resolve demand factor in humans size outcome tendered bid and material resource capacity product integration. to resolve team timeframe operational system month daily diary , -research time frame : Project ,importance time frame allocation time table research engineering and science electrical implementation break time load shedding time industrial loss gain resource human material energetic ,time table adaptation system team synchronization, asynchronous system regulation time table periodic alternative or direction energy production system cost metering production human time frame to resolve movement frequency response of team step task project in the structure, resonance learner ,metering learner teacher, resonance learner and system robot actually must be synchronized slot frequency, control loop wizard register access card system movement personal in out robot system entrepreneurs synchronization system. speed level up date need to control by human robot system technology. -Aim : overview : in the review system career learner induction or error implementation framework regulatory mandatory learner human resource in time time frame must adjustable system and resolve registered system administration standard synchronization and stability adaptor system delay register , model rwin city ,wring commission adapted illegally institutes or college need to training system and adapted in system upgrade update register circular policy engineering planning, -Engineering goals: Design , facilities learner Engineering entry model ,years learner up date ,up grade years 2023 to 2018 in college up date and new institutes and news outcyactual tendered job city. Class model grade 1 to grade 12 level n 1,6 college level , university level , N1 to n6, NQF 1,nqfto 3 qualifications framework n engineering, grade occupation certificate seignor council certificate Engineering, category, frequency term 1,2,3,4 semester move file Portofilio assessment student register Poe’s docket case indicator job logine , compare scaling,compare ,comtency rating , Synchronous induction learner speed slot intellectual quotient learner entry exhibition, efficiency learner ,average, Probability learner gate job integrity post learner Portofolio learner award learner , probably learner job equity engineering and electrician daily meeting. More less .induction error proefficuence more , Goal close tendered minimum graduat learner posted salary recruitment post , maintenace poor, ,-algorith achieve , probably. • METHOD: MATERIAL AND EQUIPMENT: methology specific guidelines assessment formative Summative rebruc,tools assessment learner and teacher ,time table allocation file student file school…workers file employment database file training job and emploie job , humain. Material stationery information Manuel and automatically system machine laptop computer ,panel system ,design,execise book log book, journal account

book, drawing sheet book,office documents wallet book,bank card register office database employment book, need, Engineering electrical material,panel projection permit office workplace register government industrial register social,policy defense security register logistics support, space power. Electrical generation transmission,distribution metering measure tools ,robot it system Port USB , Panel, equipment scaling.office study. -PROCEDURE : description Learner and teach , Education design technology support science ,and enysupport, • team step task operation activities career, Relate argument statement button Operationel preliminary task.method motivation automation ,register system input output student workclass scaling class career class ,yes statement class yes, implementation print and yes , workplace Eskom or city power available learner place yes synchronisation or inspection department education or labour gov yes adapted system accountability yes restore file system yes , , relay delay yes compare yes test control loops system yes flip file equity and statement post yes, teach system yes up date course lecons activity yes compare resolution certificate yes occupation yes qualifications yes compare systeme, questions custome system ask resolve yes meet yes training ask component framework yes activate yes implementation yes system restore maintence support system, Data systems collect and memorise award. -ETHIC : completed safety. Circulum policy framework regulatority,quality council trade council engineering, circulum policy, Education regulation regularity irregularite material fault default, insurance quality , Health injury or health time frame synchronisation,asynchronous learner , network transmission,generation distribution system synchrone,real time , images time frame safety,time frame framework stability learner , induction learner error learner outcom no meeting or learner gate damage system or break time table material stationery workplace college affect workplace industrial and municipality breakdown job injury body or robot system industrial registration move inactive receive message or not send or not incomplete,support no survey real no arrival place asynchronous LITERATURE REVIEW

-time frame : project work plan Plan orientation industrial and supervision. . orientation industrial : schedule project shift days night Management supervisor Humain resource Management system information Legal practice Date : State,: post : • teacher ’ mentor comment and suggestion: -ABSTRACT: the implementation framework circulum knowledge circulum policy engineering planing product improvement contractual agreement with register trainer and consultant engineering electrical and computer science engineering static material drawing need discovery Channel partner ways together with the quality plan on being there for system need system generated undergoing next year’s and analyse to zero loadshedding or Rental system information recommand theory practice of anticipating

dangers social media teach, -Name : tshingombe • school name : St peace college. • grade : 12/ level 6,n 6 Region Gauteng. • PROJECT TITLE: IMPLEMENTATION -ABSTRACT : -PURPOSE: -METHODE:. -project management: building for scientific mentor, school, • views school attending, Project submitted. • customer used. • application award certificate . Grade expose youth. • project creating . • school management projects Development companies. • social, science. -agricuture animal, prody agriculture, Biomedical chemistry analysis, • computer data management data science network,St earth science , atmosphere ,climate science,energy, productivity, engineering, biomedical, engineering chemistry, math, algebraic ,plant sciy, physics, astronomy,science,matter,science ,matter ,optic, -Types of project: scientific investigation: reseat questions and a hypotese, observations and , • it involves Colle , • engineering computer design , process , according,criteria,build test redesign,retest proto, -mathrmatic, theoretical, Print explot, • quantity hypothy • creative identify what. • interest focus specii topic • determy significant, value. Topics literature review. Creating ,ethic ,response research plan , Project book, Take pictures. Teacher mentor name

Teach engineering/ and Education technology. News are Cree city and commission Teach engineering youth Reflections daily Career mentor -lesson plan: -Nano technology and water What is nanotechnology, How small arbobject nano technology, Where does our water come from , How can nanotechnology make safe to drink. Activity 1,2,3 extension activity. , -nano technology and mining , wath is natechnology , wath are the danger of mining,how is nanotechnology being used to make safe , activity,2,3 ... -nanotechnology and energyb,where does ours energy come from,non renewable and renewable energy source ,how can nanotechnology help to build better solar panel , activities,1,2,3:... .nanometre... • the are used nano technology science very small ,object ,... ... ...discy, ... • apparatus , investigation, write an investigation Questions, write a hypotese for your investigation, procedure for the investigation ...make sure that your hypotheses give a clear idea of step you need , • connect your equipment so that you have build circuit shown diagram, beginning by including as completed the circuit observe brightness of the ligthbub, now,observe the brightness of the ligthbub with this shorter length, torch ,wire pencil lead,wire, now decrease the length pencil lead that has been included in your circuit once , observe the brigth of the ligthbub with this shorter length of pencil lead ,record your observations, -analyse your data. Assume the brigthness current and resistance do you notice from observations, -Write a conclusion. Write a clear conclusion to your investigate... Activity: Describe the mining danger , -activity : in group of 5 ,6 learner design and draw a poster showing how nanotechnology is being used to build gas sensors for mines, • make your poster as clear and colourful as , . • you teach will assess your using criteria. • poster is colour and creative , 2 marks,poster

shows original idea 2 marks, poster is clearly presented , 2 marks,information on poster is informative. 2 marks, group work learner were included 2marks ,total 10 marks. 2.how to build yourself a bright technical future. • considering a technical career,… • let s get down to work , • how do I pay for … Technical and artisanal not so low skilled job fact skilled, Revolution age material age skill… Myth and facts about technical careers . Myth choosing a technical course will lead a low paying job , career regards status compare,gate stuck on your career ,technical career are not for women ,is dirth work,there is not room for creativity in technical career Fact : a well qualified technicians or artisan is high demand and will earn good salary , need RSA job technical low, women do justas these career, workplace need clean , Engineering challenge are practical problem and many need creation nthar where qualifirv, .are you fascinated by how something,piece make it up together,do you prefer to make things instead of reading aboutg ides ,doubyou enjoy solving puzzles and problem,does working in team make happy ,would you like to run your business ones day a career as artisan or technicia , mechanitechnique , electrical,civilengineering technologist , Let see what you are good at , it can difficult to decide what your are good at what career you want doing is to use a theory designed, six broad type, realistic,investigative,artistic ,social,entreprise, conversation, occupation personel, -Are you realistic,are you pracal, CA you fix electrical things,do like explore machine, wath score -are you investigative , are inquisitive ,can you things abstractly, do you like to explore ides,analytical solve math problem use computer wath score, • are you artistic are you creative , sketch draw or paint all ,solve problem in original way, intituive ,use intutii.read stories,play and poetry,imagine,are you social are you friend can you teach or train other,do like to use social or interpersonal,are you enterprises,are you self confidence,star project ,do you like to make that affect, • so what now ,how do you get there , Registered Education institut NQF qualifications. Career career Pathways, ,school need subject ,wath exactly the Engineering technology field ,electrical,career pet for part… • birthday planetarium, science activity, ,erupting apples, planetarium show,science show, graphite circuit

Climbing wall package, Subject in the national curriculum statement grade ,10-13… Learning field ,elective subject, you need to have selected subject, subject refer to the , -comulsory subject ,home language n,first language,pure math , Human social studies ,physical computer, business comeerce managent ,service manufacture eny, design technology, electrical technology,eny graphics design,mecanic

Engineering it… discovery Computer , training , development and support services to existing or prospective , club house safe creative space to learner aged ,prepares learners for full participation in the 4IR and provide exposure to coding ,robotics ,sebt development, graphic design,3 d design ,2 D and 3 D modelling, animation,video production, basic computing , virtual art , year

full time development program 180 unemployment youth aged training including cisco,it Ccma ,ccna security Linux,IoT ,C,C++ , python , essential skills and career readiness, instructor training centre essential ,ccna routing and switching ,ccna security ,ccna cybersecurity operation,to existing or prospective , custome accreditation custome 3,_4 day module ,word,excell,access,Nd power point ms office,speciistr training,it also digital literacy, skills, certiport examination ms office , specifical, delivery fundiy depending learner full standard ,… University. Undergraduate, how do you conscientise students about 4 in their learning ,reality ,Google self driviy, • what about the research output research , …where are you going create new facility . • complementary roles engineer, design inovate …role in perspective, , Career psychological services focus counseling therapy psych education ,career resource ,CV job interview gradust,

to purpose: 3 ,phase synchronous machine an electromechanic energy conversion device operate speed of rotating magnetic field , synchronous machine ,bases energy, synchronisation generator, , NS = 120f/ p , number of poles the machine , Work.principlr, -key features, synchronous motor do not starting self , synchronous machine double excited machine because it requires two input supplies ones stator , synchronous machine,operate at constant speed, called , syncy generator can produce voltage magnitude ,machine lagging,leading unit, syncy motor voltage : equation of synchronous motor, V =En+Is(Ra+jxs)., - v = voltage Police ,En back end , I a armature current ,Ra armature resit, resultant voltage difft between the voltage applied V,and back EMF, Internal angle, ER, and tan @= X’s/Ra…,back EMF generated , En= ka.alpha,NS… En=v normal excitation, logging power factor, input power : input power synchy motor is given pin = v.Ia.cos ,pin = √3.v.L.I cos ,where , .mechanic power in motor ,Pm=Eb.Ia.cos (a- alpha) ,Pm= Pin - Is.Ra…Pin= √3.VL.I.L cos …is load angle.gross torque,synchry,speed , stepper motor ,B= Ns-Nr/NsxNr)*360…step angle of rotation ,ms = number of stator , resolution of stepper motor , , loady regulation= change output,no load , output volt, fault calcule breaker busbare ,IB= , I/X’s=1/x+1/x… • Implementation and stability inspection, cycle of training ,step take long time • psychomotor : and physical requirements of a job analysis survey rate the functionalite requirements of job rating class ,job analysis,process, resultat process , resultating primary resultat job session news , category data, work ,instruction , function,analyse ,PC to collect data and draw , construction job tools ,build task tools up data , • function in the real world introduction student to function ,function machine, functionalite machine easy ngrap, machine input goes same thing happened rules ,input predict output determine the input, input , metaphor by setting large cardbox machine mystery rules ,teacher student can create rules teacher created spread sheet machine, -Synchronous system asynchronous effect .phase transition Asynchron 3 space 90,120 , wave , - understand the gradient function slope slip tangent point derivative ,vector function Probly calcul gradient loss function,gradient scalar function ,have

two function partial derivatives, -Maintenance during operation abnormal yes, breakdown yes, yes scheduling, order , maintence, database yes,yes period, mid term maintence scheduled, monthly equimt inspection ,. Implementation leader Education problem counter mesirw , trainer, equipment specific,inspection educay yes,inspection trait yes,self , leader Education yes, • factory dry battery process, phenomenon batteries failling , revolving table, description loss balance,

-implementation ,system analogy,I/0 control investy application of embedded control controller to real time control algorithm input analogy output implo a closed loop ,how feedback use linearized ,non linear process and resultat in zero steddy , generate pwm outputs to implent variable motor ,supply voltage, Implementation a tachometer operational using pic 32 timer ,develop the CP program code to Implementation a pi controller moving average digital filter , monitoring display, reading embedded mechatron ,basic circuit pin microship pic , microprocessor, hardware basy trainer board workstation ,PC running windows,MC1 Linus ,12 v motor switch ,5 v,4A DC power supply,software ,mplabx plib cross , Project takeaway how read Nalog compare implent a pwu capture period measure , fundamental digital,open loop and closed ,process control , • fundamental concept ,unit introduction process electromechanic I/0 , automate process control engineering deal,automai process,open loop, DC motor speed counter record , Transfer functy magnitude response,phase shift ...

-Synchronous , .time period phase move transition job work vibration robotics system Mass spring force oscillator ... Function , mx''+cx''+kx=f(t)... non zero setui mass friction k is the spring constant,f(t), Fourie series periodic function, f(t)= for.cos(wt). • resonay, control nature frequency, control logic ,circuit , • frequency constant , capacitance,static displaced,static voltat resonance ,piezoelectric voltage constant . Synchronouse robot dynamic, kinematics and control ,nomencenture ,operator , kinematics, introduction position represent coordinator , cylindrical, coordination,linear velot,reprensation velocity Cartesian ,rotation mayris ,active ,passive rotation passive rotation, elementary rotation,representation Euler angles, unit , time derivatives of rotation ,generality coordination ,mat lab ,rigid body velocity and acceleration,task space ,co-ordinate corresponding effect, f • forward kinematics for planar robot ,are and effector ppsity, function rotation matrix c -% GETULANG XJZ from option matricr (c) extract x ,yyz Euler angler from % rotation matrices,% ,author, • xy = a tan 2.(c(2,3),((3,3)); Y=atan 2 (c(1,3),sqrt((1,1)^2+(1,2),c(1,1) Ph=[x,y,z] Lifting job , Synchronouse. Low of conservation of energy, mechanical energy (kE+PE), conservation, energie. KEi+PEi+ wnc+OE= kEf+PEF+ Oef Kinetic eny is key work conservation, PE, done by conservation forct energy are included, equation, problem,step 1. Determine the system,step potential energy conservation,KEi+PEi=KEf+PEf, step step enerivariouse ,object

phenom.efficience, Eff= useful energy or work out/ total energy input… -Total change in energy of systu, Δu=Δq(v2-v1), Δu=IΔtv (I=Δa/Δt) Total kinetic energy of system energie of system conservation,u = kinetic t, kinetic t=i.vΔt.conductor electric field greadui eneri,colliu t charge total charge vibrat of Tom heat energy conductorP=E/t… Energy ability work done =energy spent power what meant DP/St, f= dp/ St, St/ St (m.v) , solv equation ,L.di/St+RT=E°coswt…dE.dt=o demonstrate pendulum force u= m.gh dE/St>forcing constant function… -eskom smart meter infrast up grade programme relit supply empower them control consumer,meter consultation process meeting block tariff,meter renewable,customer interface prepay,remote .information meter5, -advance measure approach methode, complex energy systems monitoring and control kpi,based on integration of based of active power …

Lesson teach note: What's is nanotechnology: is NM one billion the length of matter to pir perspective, diameter average bacty 2500nm long material 100nm nano matert,nono scat material, involved the product manipulation nanoscale material products ,nanosciet consists discot and character, -activity fields nanotechnology, @0 years research plan research … • the electronics industry,wath is distinct need between electrical appliances and electronics electrical appliances and t flow of charged particles electronics in this metal conductor copper wire ,found electrical cord home appliances non metallt conductor ketler ,electron ,non metallic conductor semiconductor found cellphone… -nanoelectronics current and future applications. • origins of nanoelectronics: ,100 atoms , • computer hips semiconductor industry: CPU ,central pro easing units found computer, transistors embedded in silicon, calculatioy per second required keep ,replaced out data technology tubes 1960 s , accordiy to Moore's low named after ,PC transistor ,45 NM ,process 47 million nanoscy transistor distrt accross 26 mm ,compone computer, Components found quick retrial storage data volaty data abscen d use carbon nanotubes , computer switch data retention,data recovery during power cuts, • molecular electronics: decrease in size components molecular emerge task performance ,capacitors in electronics device ,capacitor store information, molecular been investigated act incredibly single electron . • organic light emitting diodes OLEDs : television and computer monitor ,electronic device Thea days particularly handled device mp3 player ,ligth emirtur ,OLED organic light. Emitting diode 100nm packed betwt conducting film called electront film voltage causes energy ,compare OLED ,screen film, product, • touch screen : technology as found in many table ,palm computer ,smart phones and news laptop,works , digital signal to control device interwar , layering of conductive film of indium tri oxide Ito , which conductor relay the ,x- y coordonne to processing components of the device ,smart ,ITO , technology. 1 nanowire can produced to high conductive transparent subnano wire network allowt hegher screen brightness ,with option of producing flexible screen Ito film, • improvement batteries: Devet in battery,lio batteries ,smart phone … • risk and safety issue: unique

physicochemical properties of nanomaterial electronics industry , safety humait,nano party,microsct,mass ratio risk asst , hazardous nanopt,national occupation health ,incorporate. • key issue to consider : renewable water energy have lagged , chip manufacture capabilities. • future risk assessment: The future nanotechnology in the electronics industry: • conductor,:material that can transmit heat ligth ,electrical charge in case electrical conductor electrical conductivity mesure of electrical current move through material it can see. As opposite of resistance, • semi conductor : a material that can conduct electricity.under specifical circulum voltage current flowing through common material . • led technologie: ligth emitting diode are semie conductor device emit light as current from anode to cathode .to cathode energy from of photon ,is release electron through the led device bprocess called electroluminescence, • transistor , semiconductor terminal current flowi between b, -capacitor ,an electronic components store electrical charge consiste two conductive plate separate , • electrodes , the anode is the electrode oxidation reaction takes place reduce, • graphene. Two dimensional one atom carbon atom bonded hexagonal the crystalline alloyrip structure a pure element ,pencit lead ,carbon nanotubes,hallow cylinder consistent,nested comprised of carbon atoms ,spherical carbon fulleren composed entirely carbon atom in bKk shapp also called buckbakk and buckmnjsterful,they commonly consist 60 or 79 carbon ,physicJ property , of substance relating to both it’s physical chemical. -Metering screen ,ITC manufacture nanotechnology transmission component automate , Synchronouse system , synchronous intelligence it , You will see a count of new replies because you posted a reply to this topic. • • ...

Summarize

bibliographic experimental

This extensive content explores the structure, methodology, and innovative aspects of **Sci-Bono Discovery Center** initiatives, career education, and technical studies. Below is an organized **bibliographic description and analysis** of the topics covered:

1. Career Development and Sci-Bono Discovery Center

The Sci-Bono Discovery Center serves as an educational hub for enhancing **science, technology, engineering, and mathematics (STEM)** skills, offering career counseling, workshops, and resources.

Key Features:

- **Library and Career Center Initiatives:**
  - Tools for learners to explore diverse career opportunities through mentorship and guided assessments.
  - Integration of modern technologies for research and skill development.
- **Career Discovery Focus:**
  - Connects learners to emerging fields like electrical engineering, industrial technologies, and education innovations.
  - Emphasizes psychometric testing and formative assessments to evaluate career readiness.

2. Research-Based Experimental Frameworks

Provisional Projects:

1. **Engineering and Science Initiatives:**

    - Focused on educational reform, circular assessments, and technological integration for schools and colleges.
    - Builds collaboration between **Eskom**, **municipal power systems**, and government policy frameworks.
2. **Exploring Practical Applications:**
    - Learner integration into industries like energy and manufacturing.
    - Projects designed to solve industrial and educational challenges.

3. Suggestions for Improvement

Key elements to enhance learning experiences:

1. **Clarity and Simplicity:** Ensure resources are user-friendly and accessible.
2. **Relevance:** Align content with career trends and industrial needs.
3. **Customization Options:** Personalize learning paths for diverse learner profiles.
4. **Feedback Mechanism:** Build iterative systems for continuous improvement.

4. Integrated Modules for Career Growth

Core Educational Modules:

- **Training Science Skills:** Focus on experimental tasks, problem-solving, and collaboration.
- **Time Management Skills:** Mathematical techniques to optimize project scheduling and deadlines.
- **Job Search Skills:** Practical tools for workplace readiness.

Advanced Topics:

- **Engineering and Technology Modules:**
    - Emphasizes **logical operations**, **binary conversions**, and **circuit designs**.

- **Expanded Integration:**
    - Develop technical capabilities using coding for system simulations.

5. Data Management and Application

Material and Resources:

- Use digital tools like **laptops, USB ports, and computer systems** for scalable learning and project designs.
- Integrate **robotics** and **automated systems** for operational efficiency.

System Design and Programming:

1. **Input-Output Evaluation Logic:** Automate data collection and management for engineering systems.
2. **Algorithmic Testing:** Build iterative loops to assess learner or project performance.

6. Mathematical and Technical Integration

Calculations and Derivations:

- **Energy Consumption:** $$ E = \int P(t) \, dt $$
    - Assess total energy usage in experimental systems.
- **Component Sizing:** $$ R = \rho \frac{l}{A} $$
    - Calculate material dimensions to optimize circuit performance.

Phase System Configurations:

- Modular learning in **electrical installations**, **amplifiers**, and **control systems** through phased delivery:
    - **Phase A-C:** Foundational components like resistors and rectifiers.
    - **Phase D-F:** Advanced systems (amplifiers, transistors).

7. Operational Framework and Ethics

- **Safety in Implementation:** Ensure learner and worker safety through regulatory standards.

- **Time Frames:** Adapt schedules for energy disruptions, industrial loss recovery, and academic delivery goals.

Learner Name (s): **tshingombe tshitadi**_____
Grade(s): _____12/ ___, n6 _ School Name: __st peace collge _____ _Region: gauteng _____ Project Title: __the implementation framework circulum knowledge circulum policy engineering planing product improvement contractual agreement with register trainer and consultant engineering electrical and computer science engineering

1.abstract : the implementation framework circulum knowledge circulum policy engineering planing product improvement contractual agreement with register trainer and consultant engineering electrical and computer science engineering static material drawing need discovery Channel partner ways together with the quality plan on being there for system need system generated undergoing next year's and analyse to zero loadshedding or Rental system information recommand theory practice of anticipating dangers social media teach the innovation define city power municipality government institutes city jhb delivery matter supply public and private urbanization energy electrical , And define Eskom entrepreneurs commission delivery society government industrial delivery public private energy electrical commissioner . .the school and college institutes private public define by Education department teaching learner science engineering apprentice and training and assessment of learner intellectual - need or problem defined : the research implementation problem need to resolve discovery rural and actually technology innovation industrial to integrate system to standard system knowledge support natural sciences design generated analyze combined sheet from school assessment Portfolio college career outcome Assessment information formative and Summative to workplace workshop mentoring components system to be improved or functionnning to the municipality and entrepreneurs industrial to promovate graduation in workplace. -research questions: Ask factor job career outcome transition phase learner phase exhibition phase teach beginning, intermediate,seignor get college junior cadet minim functions graduate chief post generation size industrial , development outcome machine industrial problem industrial maintenance support, manufacture support technical science actual system machine computer system news technology robot science energies need career outcome integration human and material support to resolve demand factor in humans size outcome tendered bid and material resource capacity product integration. to resolve

team timeframe operational system month daily diary 2.Purpose: Ask factor job career outcome transition phase learner phase exhibition phase teach beginning, intermediate,seignor get college junior cadet minim functions graduate chief post generation size industrial , development outcome machine industrial problem industrial maintenance support, manufacture support technical science actual system machine computer system news technology robot science energies need career outcome integration human and material support to resolve demand factor in humans size outcome tendered bid and material resource capacity product integration. to resolve team timeframe operational system month daily diary , -research time frame : Project ,importance time frame allocation time table research engineering and science electrical implementation break time load shedding time industrial loss gain resource human material energetic ,time table adaptation system team synchronization, asynchronous system regulation time table periodic alternative or direction energy production system cost metering production human time frame to resolve movement frequency response of team step task project in the structure, resonance learner ,metering learner teacher, resonance learner and system robot actually must be synchronized s 3.Method : METHOD: MATERIAL AND EQUIPMENT: methology specific guidelines assessment formative Summative rebruc,tools assessment learner and teacher ,time table allocation file student file school..workers file employment database file training job and emploie job , humain. Material stationery information Manuel and automatically system machine laptop computer ,panel system ,design,execise book log book, journal account book, drawing sheet book,office documents wallet book,bank card register office database employment book, need, Engineering electrical material,panel projection permit office workplace register government industrial register social,policy defense security register logistics support, space power. Electrical generation transmission,distribution metering measure tools ,robot it system Port USB , Panel, equipment scaling.office study.

4.Results: nano technology and mining , wath is natechnology , wath are the danger of mining,how is nanotechnology being used to make safe , activity,2,3 .. -nanotechnology and energyb,where does ours energy come from,non renewable and renewable energy source ,how can nanotechnology help to build better solar panel , activities,1,2,3:.. .nanometre..

- the are used nano technology science very small ,object ,,.. .. ..discy, ..
- apparatus , investigation, write an investigation Questions, write a hypotese for your investigation, procedure for the investigation ..make sure that your hypotheses give a clear idea of step you need ,
- connect your equipment so that you have build circuit shown diagram, beginning by including as completed the circuit observe brightness of the ligthbub, now,observe the brightness of the ligthbub with this shorter length,, torch ,wire pencil lead,wire,, now decrease the length

pencil lead that has been included in your circuit once , observe the brigth of the ligthbub with this shorter length of pencil lead ,record your observations, -analyse your data. Assume the brigthness current and resistance do you notice from observations, -Write a conclusion. Write a clear conclusion to your investigate.. Activity: Describe the mining danger ,, -activity : in group of 5 ,6 learner design and draw a poster showing how nanotechnology is being used to build gas sensors for mines,

- make your poster as clear and colourful as , .
- you teach will assess your using criteria.
- poster is colour and creative , 2 marks,poster shows original idea 2 marks, poster is clearly presented , 2 marks,information on poster is informative. 2 .

5. Conclusion : Engineering it... discovery Computer , training , development and support services to existing or prospective , club house safe creative space to learner aged ,prepares learners for full participation in the 4IR and provide exposure to coding ,robotics ,sebt development, graphic design,3 d design ,2 D and 3 D modelling, animation,video production, basic computing , virtual art , year full time development program 180 unemployment youth aged training including cisco,it Ccma ,ccna security Linux,IoT ,C,C++ , python , essential skills and career readiness, instructor training centre essential ,ccna routing and switching ,ccna security ,ccna cybersecurity operation,to existing or prospective , custome accreditation custome 3,_4 day module ,word,excell,access,Nd power point ms office,speciistr training,it also digital literacy, skills, certiport examination ms office , specifical, delivery fundiy depending learner full standard ,..

University. Undergraduate, how do you conscientise students about 4 in their learning ,reality ,Google self driviy,

- what about the research output research , ..where are you going create new facility .
- complementary roles engineer, design inovate ..role in perspective, , Career psychological services focus counseling therapy psych education ,career resource ,CV job interview gradust,

Eskom Expo for Young Scientists RESEARCH PLAN

1. Research Plan Templates for: 1.1. Scientific Investigations Projects/Experiments

1.2. Engineering Type Projects and Computer Science Projects • For these types of projects, • a design process is followed according to criteria, to

build and test-redesign-retest a prototype/product/solution e.g. a device or a computer code

1.3. Social Sciences Projects • Social Sciences research involves an objective and systematic method of exploring and analysing human behaviour, social issues and other phenomena. It involves collecting qualitative and/or quantitative data

1.4. Mathematics/Theoretical Projects • Mathematics projects explore quantity, structure, space and change. Starting with an observation, problem or question, make conjectures/hypotheses, prove your claim using new or existing methods, make valid deductions and test your ideas theoretically. Your reasoning and arguments must be logical

.2.2 SCIENTIFIC INVESTIGATIONS/EXPERIMENTS NAME:*tshingombe tshitadi*_____ _____ PROVISIONAL PROJECT TOPIC:_____ PROVISIONAL EXPO CATEGORY:_____ ¬¬

- NAME : TSHINGOMBE TSHITADI

-PROVISIONAL PROJECT TOPIC: IMPLEMENTATION FRAMEWORK POLICY COLLEGE AND SCHOOL ENGINEERING CIRCULAR ASSESSMENT POLICE EDUCATION TECHNOLOGY TEACH AND TECHNOLOGY ELECTRICAL SUBJECT SCHOOL QUALIFICATION LEVEL IN ENTREPRERSHIP AND INDUSTRIE SOCIETY COMMISSIONING AND GOVERNMENT MUNICIPALITY TEAM TRAINING WORK GRADUATION ENGINEERING TIMEFRAME .ST PEACE COLLEGE SCHOOL ORIENTATION GUIDE MANUEL POLICY -PROVISIONAL PROJECT EXPO CATEGORY..:

- INTRODUCTION:

2.3 Introduction 2.3.4 Literature review: ?Define concepts/definitions .What are the benefits/significance of doing this research/who will benefit?

2.3.4 Problem Statement: What problem/issue will you be addressing?

2.2.5 Research question(s):). Aim: What is the aim/objective of this research project?

2.2.6 Hypothesis: Variables: List the independent, dependent and the controlled/fixed variables

2.2.7. Method Materials Procedurend record the data? Data analysis: How will you analyse the data?

Ethics Safety Time Frames

2.2.8 References .

Teacher’s/Mentor’s comments and suggestions:

Teacher’s/Mentor’s name, signature and date: ENGINEERING TYPE/COMPUTER SCIENCE PROJECTS

NAME: _____tshingombe
_____
PROVISIONAL PROJECT TOPIC:
_____ PROVISIONAL EXPO CATEGORY:
_____ ¬¬

- NAME : TSHINGOMBE TSHITADI

-PROVISIONAL PROJECT TOPIC: IMPLEMENTATION FRAMEWORK POLICY COLLEGE AND SCHOOL ENGINEERING CIRCULAR ASSESSMENT POLICE EDUCATION TECHNOLOGY TEACH AND TECHNOLOGY ELECTRICAL SUBJECT SCHOOL QUALIFICATION LEVEL IN ENTREPRERSHIP AND INDUSTRIE SOCIETY COMMISSIONING AND GOVERNMENT MUNICIPALITY TEAM TRAINING WORK GRADUATION ENGINEERING TIMEFRAME .ST PEACE COLLEGE SCHOOL ORIENTATION GUIDE MANUEL POLICY -PROVISIONAL PROJECT EXPO CATEGORY..:

- INTRODUCTION:

Interview ask

Introduction ? Need or Problem Defined: it? Research question(s): and guides the method section. It must be clear, concise and specific (must not be a Yes or No answer). Aim:? Engineering Goals or Design Goals or Algorithms: Method Materials: List the materials and equipment you will use.

Procedure: Data analysis: How will you test the prototype/solution and record the results?

Preliminary Designs: Include labelled diagrams (include scale, measurements with units) of the first prototype/solution and descriptions of the design ideas.

Ethics Safety If you do not have any potential safety issues, leave section blank.

Time Frames Poster?

References

Teacher’s/Mentor’s comments and suggestions: Research. Career, Eskom, city power municipality , department education, science expo,college institutes school., project

1.RESEARCH PLAN:

- ENGINEERING TYPE,AND SCIENCE COMPUTER
- NAME : TSHINGOMBE TSHITADI

-PROVISIONAL PROJECT TOPIC: IMPLEMENTATION FRAMEWORK POLICY COLLEGE AND SCHOOL ENGINEERING CIRCULAR ASSESSMENT POLICE EDUCATION TECHNOLOGY TEACH AND TECHNOLOGY ELECTRICAL SUBJECT SCHOOL QUALIFICATION LEVEL IN ENTREPRERSHIP AND INDUSTRIE SOCIETY COMMISSIONING AND GOVERNMENT MUNICIPALITY TEAM TRAINING WORK GRADUATION ENGINEERING TIMEFRAME .ST PEACE COLLEGE SCHOOL ORIENTATION GUIDE MANUEL POLICY -PROVISIONAL PROJECT EXPO CATEGORY..:

- INTRODUCTION:

the innovation define city power municipality government institutes city jhb delivery matter supply public and private urbanization energy electrical , And define Eskom entrepreneurs commission delivery society government industrial delivery public private energy electrical commissioner . .the school and college institutes private public define by Education department teaching learner science engineering apprentice and training and assessment of learner intellectual -need or problem defined : the research implementation problem need to resolve discovery rural and actually technology innovation industrial to integrate system to standard system knowledge support natural sciences design generated analyze combined sheet from school assessment Portfolio college career outcome Assessment information formative and Summative to workplace workshop mentoring components system to be improved or functionnning to the municipality and entrepreneurs industrial to promovate graduation in workplace. -research

questions: Ask factor job career outcome transition phase learner phase exhibition phase teach beginning, intermediate,seignor get college junior cadet minim functions graduate chief post generation size industrial , development outcome machine industrial problem industrial maintenance support, manufacture support technical science actual system machine computer system news technology robot science energies need career outcome integration human and material support to resolve demand factor in humans size outcome tendered bid and material resource capacity product integration. to resolve team timeframe operational system month daily diary , -research time frame : Project ,importance time frame allocation time table research engineering and science electrical implementation break time load shedding time industrial loss gain resource human material energetic ,time table adaptation system team synchronization, asynchronous system regulation time table periodic alternative or direction energy production system cost metering production human time frame to resolve movement frequency response of team step task project in the structure, resonance learner ,metering learner teacher, resonance learner and system robot actually must be synchronized slot frequency, control loop wizard register access card system movement personal in out robot system entrepreneurs synchronization system. speed level up date need to control by human robot system technology. -Aim : overview : in the review system career learner induction or error implementation framework regulatory mandatory learner human resource in time time frame must adjustable system and resolve registered system administration standard synchronization and stability adaptor system delay register , model rwin city ,wring commission adapted illegally institutes or college need to training system and adapted in system upgrade update register circular policy engineering planning, -Engineering goals: Design , facilities learner Engineering entry model ,years learner up date ,up grade years 2023 to 2018 in college up date and new institutes and news outcyactual tendered job city. Class model grade 1 to grade 12 level n 1,6 college level , university level , N1 to n6, NQF 1,nqfto 3 qualifications framework n engineering, grade occupation certificate seignor council certificate Engineering, category, frequency term 1,2,3,4 semester move file Portofilio assessment student register Poe's docket case indicator job logine , compare scaling,compare ,comtency rating , Synchronous induction learner speed slot intellectual quotient learner entry exhibition, efficiency learner ,average, Probability learner gate job integrity post learner Portofolio learner award learner , probably learner job equity engineering and electrician daily meeting. More less .induction error proefficuence more , Goal close tendered minimum graduat learner posted salary recruitment post , maintenace poor, ,-algorith achieve , probably.

- METHOD: MATERIAL AND EQUIPMENT: methology specific guidelines assessment formative Summative rebruc,tools assessment learner and teacher ,time table allocation file student file

school..workers file employment database file training job and emploie job , humain. Material stationery information Manuel and automatically system machine laptop computer ,panel system ,design,execise book log book, journal account book, drawing sheet book,office documents wallet book,bank card register office database employment book, need, Engineering electrical material,panel projection permit office workplace register government industrial register social,policy defense security register logistics support, space power. Electrical generation transmission,distribution metering measure tools ,robot it system Port USB , Panel, equipment scaling.office study.

-PROCEDURE : description Learner and teach , Education design technology support science ,and enysupport,

- team step task operation activities career,
  Relate argument statement button Operationel preliminary task.method motivation automation ,register system input output student workclass scaling class career class ,yes statement class yes, implementation print and yes , workplace Eskom or city power available learner place yes synchronisation or inspection department education or labour gov yes adapted system accountability yes restore file system yes , , relay delay yes compare yes test control loops system yes flip file equity and statement post yes, teach system yes up date course lecons activity yes compare resolution certificate yes occupation yes qualifications yes compare systeme, questions custome system ask resolve yes meet yes training ask component framework yes activate yes implementation yes system restore maintence support system, Data systems collect and memorise award. -ETHIC : completed safety. Circulum policy framework regulatority,quality council trade council engineering, circulum policy, Education regulation regularity irregularite material fault default, insurance quality , Health injury or health time frame synchronisation,asynchronous learner , network transmission,generation distribution system synchrone,real time , images time frame safety,time frame framework stability learner , induction learner error learner outcom no meeting or learner gate damage system or break time table material stationery workplace college affect workplace industrial and municipality breakdown job injury body or robot system industrial registration move inactive receive message or not send or not incomplete,support no survey real no arrival place asynchronous

2.LITERATURE REVIEW

-time frame : project work plan Plan orientation industrial and supervision. . orientation industrial : schedule project shift days night Management supervisor Humain resource Management system information Legal practice

Date : State,: post :

- teacher ' mentor comment and suggestion:

-3. ABSTRACT: the implementation framework circulum knowledge circulum policy engineering planing product improvement contractual agreement with register trainer and consultant engineering electrical and computer science engineering static material drawing need discovery Channel partner ways together with the quality plan on being there for system need system generated undergoing next year's and analyse to zero loadshedding or Rental system information recommand theory practice of anticipating dangers social media teach, -Name : tshingombe

- school name : St peace college.
- grade : 12/ level 6,n 6 Region Gauteng.
- PROJECT TITLE: IMPLEMENTATION -ABSTRACT : -PURPOSE: -METHODE:.

-project management: building for scientific mentor, school,

- views school attending, Project submitted.
- customer used.
- application award certificate . Grade expose youth.
- project creating .
- school management projects Development companies.
- social, science. -agricuture animal, prody agriculture, Biomedical chemistry analysis,
- computer data management data science network,St earth science , atmosphere ,climate science,energy, productivity, engineering, biomedical, engineering chemistry, math, algebraic ,plant sciy, physics, astronomy,science,matter,science ,matter ,optic,

-Types of project: scientific investigation: reseat questions and a hypotese, observations and ,

- it involves Colle ,
- engineering computer design , process , according,criteria,build test redesign,retest proto,

-mathrmatic, theoretical, Print explot,

- quantity hypothy
- creative identify what.
- interest focus specii topic
- determy significant, value. Topics literature review.
  Creating ,ethic ,response research plan , Project book, Take pictures.

2. Teacher mentor name

Teach engineering/ and Education technology. News are Cree city and commission

Teach engineering youth Reflections daily Career mentor -lesson plan: -Nano technology and water What is nanotechnology, How small arbobject nano technology, Where does our water come from , How can nanotechnology make safe to drink. Activity 1,2,3 extension activity.

, -nano technology and mining , wath is natechnology , wath are the danger of mining,how is nanotechnology being used to make safe , activity,2,3 .. -nanotechnology and energyb,where does ours energy come from,non renewable and renewable energy source ,how can nanotechnology help to build better solar panel , activities,1,2,3:.. .nanometre..

- the are used nano technology science very small ,object ,,.. .. ..discy, ..
- apparatus , investigation, write an investigation Questions, write a hypotese for your investigation, procedure for the investigation ..make sure that your hypotheses give a clear idea of step you need ,
- connect your equipment so that you have build circuit shown diagram, beginning by including as completed the circuit observe brightness of the ligthbub, now,observe the brightness of the ligthbub with this shorter length,, torch ,wire pencil lead,wire,, now decrease the length pencil lead that has been included in your circuit once , observe the brigth of the ligthbub with this shorter length of pencil lead ,record your observations, -analyse your data. Assume the brigthness current and resistance do you notice from observations, -Write a conclusion. Write a clear conclusion to your investigate.. Activity: Describe the mining danger ,, -activity : in group of 5 ,6 learner design and draw a poster showing how nanotechnology is being used to build gas sensors for mines,
- make your poster as clear and colourful as , .
- you teach will assess your using criteria.
- poster is colour and creative , 2 marks,poster shows original idea 2 marks, poster is clearly presented , 2 marks,information on poster is informative. 2 marks, group work learner were included 2marks ,total 10 marks. 2.how to build yourself a bright technical future.
- considering a technical career,..
- let s get down to work ,

- how do I pay for .. Technical and artisanal not so low skilled job fact skilled, Revolution age material age skill.. Myth and facts about technical careers . Myth choosing a technical course will lead a low paying job , career regards status compare,gate stuck on your career ,technical career are not for women ,is dirth work,there is not room for creativity in technical career Fact : a well qualified technicians or artisan is high demand and will earn good salary , need RSA job technical low, women do justas these career, workplace need clean , Engineering challenge are practical problem and many need creation nthar where qualifirv,, .are you fascinated by how something,piece make it up together,do you prefer to make things instead of reading aboutg ides ,doubyou enjoy solving puzzles and problem,does working in team make happy ,would you like to run your business ones day a career as artisan or technicia ,, mechanitechnique , electrical,civilengineering technologist , Let see what you are good at , it can difficult to decide what your are good at what career you want doing is to use a theory designed, six broad type, realistic,investigative,artistic ,social,entreprise, conversation, occupation personel, -Are you realistic,are you pracal, CA you fix electrical things,do like explore machine, wath score -are you investigative , are inquisitive ,can you things abstractly, do you like to explore ides,,analytical solve math problem use computer wath score,
- are you artistic are you creative , sketch draw or paint all ,solve problem in original way, intituive ,use intutii.read stories,play and poetry,imagine,,are you social are you friend can you teach or train other,do like to use social or interpersonal,are you enterprises,are you self confidence,star project ,do you like to make that affect,
- so what now ,how do you get there , Registered Education institut NQF qualifications. Career career Pathways, ,school need subject ,wath exactly the Engineering technology field ,electrical,career pet for part..
- birthday planetarium, science activity, ,erupting apples, planetarium show,science show, graphite circuit

Climbing wall package, Subject in the national curriculum statement grade ,10-13.. Learning field ,elective subject, you need to have selected subject, subject refer to the , -comulsory subject ,home language n,first language,pure math , Human social studies ,physical computer, business comeerce managent ,service manufacture eny, design technology, electrical technology,eny graphics design,mecanic

Engineering it... discovery Computer , training , development and support services to existing or prospective , club house safe creative space to learner aged ,prepares learners for full participation in the 4IR and provide exposure to coding ,robotics ,sebt development, graphic design,3 d design ,2 D and 3 D modelling, animation,video production, basic computing

, virtual art , year full time development program 180 unemployment youth aged training including cisco,it Ccma ,ccna security Linux,IoT ,C,C++ , python , essential skills and career readiness, instructor training centre essential ,ccna routing and switching ,ccna security ,ccna cybersecurity operation,to existing or prospective , custome accreditation custome 3,_4 day module ,word,excell,access,Nd power point ms office,speciistr training,it also digital literacy, skills, certiport examination ms office , specifical, delivery fundiy depending learner full standard ,..

University. Undergraduate, how do you conscientise students about 4 in their learning ,reality ,Google self driviy,

- what about the research output research , ..where are you going create new facility .
- complementary roles engineer, design inovate ..role in perspective, , Career psychological services focus counseling therapy psych education ,career resource ,CV job interview gradust,

to

purpose: 3 ,,phase synchronous machine an electromechanic energy conversion device operate speed of rotating magnetic field , synchronous machine ,bases energy, synchronisation generator, , NS = 120f/ p , number of poles the machine , Work.principlr, -key features, synchronous motor do not starting self , synchronous machine double excited machine because it requires two input supplies ones stator , synchronous machine,operate at constant speed, called , syncy generator can produce voltage magnitude ,machine lagging,leading unit, syncy motor voltage : equation of synchronous motor, V =En+Is(Ra+jxs)., - v = voltage Police ,En back end , I a armature current ,Ra armature resit, resultant voltage difft between the voltage applied V,and back EMF, Internal angle, ER, and tan @= X's/Ra..,back EMF generated , En= ka.alpha,NS.. En=v normal excitation, logging power factor, input power : input power synchy motor is given pin = v.Ia.cos ,,,pin = √3.v.L.I cos ,where ,, .mechanic power in motor ,Pm=Eb.Ia.cos (a- alpha) ,,,Pm= Pin - Is.Ra..Pin= √3.VL.I.L cos ..is load angle.gross torque,synchry,speed , stepper motor ,B= Ns-Nr/NsxNr)*360..step angle of rotation ,ms = number of stator , resolution of stepper motor , , loady regulation= change output,no load , output volt,, fault calcule breaker busbare ,IB= , I/X's=1/x+1/x..

- Implementation and stability inspection, cycle of training ,step take long time
- psychomotor : and physical requirements of a job analysis survey rate the functionalite requirements of job rating class ,job analysis,process, resultat process , resultating primary resultat job session news , category data, work ,instruction , function,analyse ,PC

to collect data and draw , construction job tools ,build task tools up data ,,

- function in the real world introduction student to function ,function machine, functionalite machine easy ngrap, machine input goes same thing happened rules ,input predict output determine the input, input , metaphor by setting large cardbox machine mystery rules ,teacher student can create rules teacher created spread sheet machine,,,, -Synchronous system asynchronous effect .phase transition Asynchron 3 space 90,120 , wave ,, -understand the gradient function slope slip tangent point derivative ,vector function Probly calcul gradient loss function,,gradient scalar function ,have two function partial derivatives, -Maintenance during operation abnormal yes, breakdown yes, yes scheduling, order , maintence, database yes,yes period, mid term maintence scheduled, monthly equimt inspection ,. Implementation leader Education problem counter mesirw , trainer, equipment specific,inspection educay yes,inspection trait yes,self , leader Education yes,
- factory dry battery process, phenomenon batteries failling , revolving table, description loss balance,

-implementation ,system analogy,I/0 control investy application of embedded control controller to real time control algorithm input analogy output implo a closed loop ,how feedback use linearized ,non linear process and resultat in zero steddy , generate pwm outputs to implent variable motor ,supply voltage, Implementation a tachometer operational using pic 32 timer ,develop the CP program code to Implementation a pi controller moving average digital filter , monitoring display, reading embedded mechatron ,basic circuit pin microship pic , microprocessor, hardware basy trainer board workstation ,PC running windows,MC1 Linus ,12 v motor switch ,5 v,4A DC power supply,software ,mplabx plib cross ,
Project takeaway how read Nalog compare implent a pwu capture period measure , fundamental digital,open loop and closed ,process control ,

- fundamental concept ,unit introduction process electromechanic I/0 , automate process control engineering deal,automai process,open loop, DC motor speed counter record , Transfer functy magnitude response,phase shift ..

-Synchronous , .time period phase move transition job work vibration robotics system Mass spring force oscillator ... Function , mx''+cx''+kx=f(t)..non zero setui mass friction k is the spring constant,f(t), Fourie series periodic function, f(t)= for.cos(wt).

- resonay, control nature frequency, control logic ,circuit ,
- frequency constant , capacitance,static displaced,static voltat resonance ,piezoelectric voltage constant .

Synchronouse robot dynamic, kinematics and control ,nomencenture ,operator , kinematics, introduction position represent coordinator , cylindrical, coordination,linear velot,reprensation velocity Cartesian ,rotation mayris ,active ,passive rotation passive rotation, elementary rotation,representation Euler angles, unit , time derivatives of rotation ,generality coordination ,mat lab ,rigid body velocity and acceleration,task space ,co-ordinate corresponding effect, f

- forward kinematics for planar robot ,are and effector ppsity, function rotation matrix c -% GETULANG XJZ from option matricr (c) extract x ,yyz Euler angler from % rotation matrices,% ,author,
- xy = a tan 2.(c(2,3),((3,3)); Y=atan 2 (c(1,3),sqrt((1,1)^2+(1,2),c(1,1) Ph=[x,y,z] Lifting job ,,,

Synchronouse. Low of conservation of energy, mechanical energy (kE+PE), conservation, energie. KEi+PEi+ wnc+OE= kEf+PEF+ Oef Kinetic eny is key work conservation, PE, done by conservation forct energy are included, equation, problem,step 1. Determine the system,step potential energy conservation,KEi+PEi=KEf+PEf, step step enerivariouse ,object phenom.efficience, Eff= useful energy or work out/ total energy input.... - Total change in energy of systu, Δu=Δq(v2-v1),, Δu=IΔtv (I=Δa/Δt) Total kinetic energy of system energie of system conservation,u = kinetic t, kinetic t=i.vΔt.conductor electric field greadui eneri,colliu t charge total charge vibrat of Tom heat energy conductorP=E/t.. Energy ability work done =energy spent power what meant DP/St, f= dp/ St, St/ St (m.v) , solv equation ,,L.di/St+RT=E°coswt..dE.dt=o demonstrate pendulum force u= m.gh dE/St>forcing constant function..

-eskom smart meter infrast up grade programme relit supply empower them control consumer,meter consultation process meeting block tariff,meter renewable,customer interface prepay,remote .information meter5,, - advance measure approach methode, complex energy systems monitoring and control kpi,based on integration of based of active power ..

Lesson teach note: What's is nanotechnology: is NM one billion the length of matter to pir perspective, diameter average bacty 2500nm long material 100nm nano matert,,,nono scat material, involved the product manipulation nanoscale material products ,nanosciet consists discot and character, - activity fields nanotechnology, @0 years research plan research ...

- the electronics industry,wath is distinct need between electrical appliances and electronics electrical appliances and t flow of charged particles electronics in this metal conductor copper wire ,found electrical cord home appliances non metallt conductor ketler ,electron ,non metallic conductor semiconductor found cellphone.. - nanoelectronics current and future applications.

- origins of nanoelectronics: ,100 atoms ,
- computer hips semiconductor industry: CPU ,central pro easing units found computer, transistors embedded in silicon, calculatioy per second required keep ,replaced out data technology tubes 1960 s , accordiy to Moore's low named after ,PC transistor ,45 NM ,process 47 million nanoscy transistor distrt accross 26 mm ,compone computer,, Components found quick retrial storage data volaty data abscen d use carbon nanotubes , computer switch data retention,data recovery during power cuts,
- molecular electronics: decrease in size components molecular emerge task performance ,capacitors in electronics device ,capacitor store information, molecular been investigated act incredibly single electron .
- organic light emitting diodes OLEDs : television and computer monitor ,electronic device Thea days particularly handled device mp3 player ,ligth emirtur ,OLED organic light. Emitting diode 100nm packed betwt conducting film called electront film voltage causes energy ,compare OLED ,screen film, product,
- touch screen : technology as found in many table ,palm computer ,smart phones and news laptop,works , digital signal to control device interwar , layering of conductive film of indium tri oxide Ito , which conductor relay the ,x- y coordonne to processing components of the device ,smart ,ITO , technology. 1 nanowire can produced to high conductive transparent subnano wire network allowt hegher screen brightness ,with option of producing flexible screen Ito film,
- improvement batteries: Devet in battery,lio batteries ,smart phone ..
- risk and safety issue: unique physicochemical properties of nanomaterial electronics industry , safety humait,nano party,microsct,mass ratio risk asst , hazardous nanopt,national occupation health ,incorporate.
- key issue to consider : renewable water energy have lagged ,, chip manufacture capabilities.
- future risk assessment: The future nanotechnology in the electronics industry:
- conductor,:material that can transmit heat ligth ,electrical charge in case electrical conductor electrical conductivity mesure of electrical current move through material it can see. As opposite of resistance,
- semi conductor : a material that can conduct electricity.under specifical circulum voltage current flowing through common material .
- led technologie: ligth emitting diode are semie conductor device emit light as current from anode to cathode .to cathode energy from of photon ,is release electron through the led device bprocess called electroluminescence,

- transistor , semiconductor terminal current flowi between b, -capacitor ,an electronic components store electrical charge consiste two conductive plate separate ,
- electrodes , the anode is the electrode oxidation reaction takes place reduce,
- graphene. Two dimensional one atom carbon atom bonded hexagonal the crystalline alloyrip structure a pure element ,pencit lead ,carbon nanotubes,hallow cylinder consistent,nested comprised of carbon atoms ,spherical carbon fulleren composed entirely carbon atom in bKk shapp also called buckbakk and buckmnjsterful,they commonly consist 60 or 79 carbon ,physicJ property , of substance relating to both it's physical chemical.

-Metering screen ,ITC manufacture nanotechnology transmission component automate ,, Synchronouse system , synchronous intelligence it ,

Teacher’s/Mentor’s name, signature and date:

SOCIAL SCIENCES PROJECTS

NAME: _____tshingombe tshitadi

_____

PROVISIONAL PROJECT TOPIC:

_____ PROVISIONAL EXPO CATEGORY:

_____ ¬¬ Delete all guidelines under the following headings once you have completed your Research Plan

Introduction ? Problem Statement: What problem(s)/issue will you be addressing/exploring? Write the research question(s) or problem statement.

Research question(s): Question). Aim: What is the aim/objective of this research project?

Hypothesis: Variables: Method Procedure: tables, graphs?

Ethics Safety If you do not have any potential safety issues, leave section blank.

Time Frames

References

Teacher’s/Mentor’s comments and suggestions:

tshingombefiston@gmail.com Aug 28, 2023, 8:09 PM (6 days ago)

to Support

Project social.. 1.

2. Social investigation : science natural Support social creation and recreation orientation circulum Assessment police social enterprise entrepreneurs sector products resource energie electrical commissioner ,training support system circulum , synchronouse system social machinery social safety government system in the time framework regulatority circulum sector education grade and level in the job system , development sub sectorial system system social worker synchronouse Social worker public work system basic advanced must synchronouse with social system , labour worker OSHA safety society synchronouse with Commission electrical engineering worker data,
3.

3.1Teacher mentor :social education Social education labour and land reform system , organisation entrepreneurs and humain resource system education system asynchronous,system class society ,grade society science mass media society work classes.

- families class work project, organisation non governmental social education entrepreneurs workers sub sector self employed self business was illegal or fraudulent system in normale system entreprise government system asynchron, need to educate social media by training for to synchronouse, -3.2 lesson system social media support rural to teach and non gov,

-file worker, size years, skill development,size ,class skill ,model frequency ,means , value compared ,size social skill or semie skill grade , qualifications employment years , normal ,criteria choice guidelines normal, ,,report learner ,report job normal work labour synchronouse , report job pay hr give normal conditions , . Calcul system find balance merge social .good job

- 1..mathematic investigation , Framework regulation circulum policy for mathematics resolve , problem for science discovery system Equation computing system equation, algebraic logic , analyse system mathematics find problem or concept ,proof existence natural system undercover real problem in natural System exper or artificial intelligence or language reason calcul,

Synchronouse system to find more equation algebraic ,complex numbers master system deviations system ,equation find mathematics number master skill knowledge,proof existence of system function or gradient function ,function was real on distribution and transmission power ,was real system that was equation remarks for master number , mensuration system equation and compare slop of number deviation ,angle period time volatility time loss time break ,that was equation , trigonometry and geometric pattern number , statistics and probability to find on projectsion number real and case reason for linear systems..

1.2Teacher mentoring: Teacher education,system mathematics education subject lesson circulum, apply skill compilation language logic intelligence or robot system capacity of synchronouse system, mastering skill number use instrumental take measurements rule and measure instrument for understanding Lesson plan orthopedafic projection planing , synchronouse ,system scale analyse geomatic geodesis ,vector equation quadratic linear synchronouse mensuration equation , Activities ,system resolve plan diagram current sinusoidal wave form angular system projection orthopedics activities,design form , computer language wave,

1.science natural chemistry physics:

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- project Investigation: natural science: earth moon sun planets system quantum years ligthning years days start day end of day system ergonomic design Natural teach discovery science engineering Investigation , physical and chemical, Engineering ,computer information technology, mathematics mental calculation

agronomical grade class agreement , grade geotechnical grade class years geography engineering,mining investigation grade class matter Investigation, science class matter elevation matter atomic cycle ,Watters cycle , recyclage matter ,investigation find matter chemical composition matter ,solid ,GAZ liquid state , molecular ion electronics development skill materials ,charge dischage movement find current electrical mining agreement , degradation material and graduation material system , synchronouse material system Earth system cycle life skills ,,.. Chemical. Size system difficulties to synchronouse for reason challenging life and disorder order natural system undercover real problem, industrustriel - Physical state matter Liquide to GAZ,GAZ solde ,solide to GAZ process Synchronouse phase transition matter, Electricity man's mecanic,

- electrostatic ,electrocinetic, electrodynamic, electromagnetic, static,dynamic ,cinematic , Electrostatic investigation phase system matter transformation ,force electrostatic transition electrodynamic

phase to electrodynamic current to resistance resistance to field magnetic,,force mass phase ,generation phased to transform phased , system skill , transmission , distribution system synchronouse real time ion matterial speed celerity transmission ,km/s

- teaching education ,science natural investigation , psychosocial psycho science development system natural task system computing file system Education technology system science didacic system framework regulator, Teaching phase transition phase synchronouse system development , chemical sciences ,,material phase material transformation plastic ,elastic deformation material ,, computer system matterial decomposition chemical atomic spray eating phase GAZ generation force cycle synchronouse system generation to system transmission and distribution Metering, ,atomic spray heater product coil consumption phase cycle generation system going ,to transmission ionique chemical computer system grade support to grade transformation synchro reactance system , electrostatic electrodynamic magnetic synchronouse to wave to distribution system ,,, resistance way system for material recyclage, phase material strengths,,

Teacher’s/Mentor’s name, signature and date:

Social education, education environment ,geographic life cycle industrial recycle synchronise system biogenes system hygiene system project expo science

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Support support@exposcience.co.za Tue, Aug 29, 2023 at 8:59 AM To: tshingombe fiston tshingombefiston@gmail.com Good day

Did you participate with the same project at a regional expo?

Expo Team 63 Reier Road|Atlasville|Boksburg|Gauteng|1459|South Africa T: +27 11 894 1365 |F2M:+27 866243127 www.exposcience.co.za

-TOPICS ; DISCOVERY INVENTOR SCIENCE TECHNICAL TECHNOLOGY ENGINEERING -SUB TOPIC: DEPATMENT EDUCATION -SCIE BONO: EXPO SCIENCE / FUND EXPO, / TECHNO SCIENCE EXPO

-NAME CASE STUDY: -LEARNER NAME: -EDUCATOR NAME: -REF: -TOPICS ASSESSMNT SUMMARY: PENTENT INVENTION CLAIM RELATE LOW TRADE MANUFACTURE PROCESS, -BOOK INVENTION PROCESS RESEARCH PAPPER LITERAIRE PRICE LESSON PLAN
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REF UNITY DESIGN CHECK Y/N MEET INVENT PRICE NOBEL INVENTION DISCOVERY; AWARD BOOK , REWARD BOOK PURCHACHE AERN BOOK, RERWITEN BOOK INVENTION PROJECT ,

his extensive content explores the structure, methodology, and innovative aspects of **Sci-Bono Discovery Center** initiatives, career education, and technical studies. Below is an organized **bibliographic description and analysis** of the topics covered:

1. Career Development and Sci-Bono Discovery Center

The Sci-Bono Discovery Center serves as an educational hub for enhancing **science, technology, engineering, and mathematics (STEM)** skills, offering career counseling, workshops, and resources.

Key Features:

- **Library and Career Center Initiatives:**
    - Tools for learners to explore diverse career opportunities through mentorship and guided assessments.
    - Integration of modern technologies for research and skill development.
- **Career Discovery Focus:**
    - Connects learners to emerging fields like electrical engineering, industrial technologies, and education innovations.

- Emphasizes psychometric testing and formative assessments to evaluate career readiness.

2. Research-Based Experimental Frameworks

Provisional Projects:

1. **Engineering and Science Initiatives:**
   - Focused on educational reform, circular assessments, and technological integration for schools and colleges.
   - Builds collaboration between **Eskom**, **municipal power systems**, and government policy frameworks.
2. **Exploring Practical Applications:**
   - Learner integration into industries like energy and manufacturing.
   - Projects designed to solve industrial and educational challenges.

3. Suggestions for Improvement

Key elements to enhance learning experiences:

1. **Clarity and Simplicity:** Ensure resources are user-friendly and accessible.
2. **Relevance:** Align content with career trends and industrial needs.
3. **Customization Options:** Personalize learning paths for diverse learner profiles.
4. **Feedback Mechanism:** Build iterative systems for continuous improvement.

4. Integrated Modules for Career Growth

Core Educational Modules:

- **Training Science Skills:** Focus on experimental tasks, problem-solving, and collaboration.

- **Time Management Skills:** Mathematical techniques to optimize project scheduling and deadlines.
- **Job Search Skills:** Practical tools for workplace readiness.

Advanced Topics:

- **Engineering and Technology Modules:**
    - Emphasizes **logical operations**, **binary conversions**, and **circuit designs**.
- **Expanded Integration:**
    - Develop technical capabilities using coding for system simulations.

5. Data Management and Application

Material and Resources:

- Use digital tools like **laptops, USB ports, and computer systems** for scalable learning and project designs.
- Integrate **robotics** and **automated systems** for operational efficiency.

System Design and Programming:

1. **Input-Output Evaluation Logic:** Automate data collection and management for engineering systems.
2. **Algorithmic Testing:** Build iterative loops to assess learner or project performance.

6. Mathematical and Technical Integration

Calculations and Derivations:

- **Energy Consumption:** $$ E = \int P(t) \, dt $$
    - Assess total energy usage in experimental systems.
- **Component Sizing:** $$ R = \rho \frac{l}{A} $$

    - Calculate material dimensions to optimize circuit performance.

Phase System Configurations:

- Modular learning in **electrical installations**, **amplifiers**, and **control systems** through phased delivery:
    - **Phase A-C:** Foundational components like resistors and rectifiers.
    - **Phase D-F:** Advanced systems (amplifiers, transistors).

7. Operational Framework and Ethics

- **Safety in Implementation:** Ensure learner and worker safety through regulatory standards.
- **Time Frames:** Adapt schedules for energy disruptions, industrial loss recovery, and academic delivery goals.